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Copperwood Flats
Block 125

Servicing and Stormwater Management Report

Copperwood Flats

Block 125

City of Ottawa

Servicing and Stormwater Management Report

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

March 21, 2025
Revised: May 09, 2025

Novatech File: 122144
Ref: R-2025-009

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Engineers, Planners & Landscape Architects

May 9, 2025

City of Ottawa
Planning, Infrastructure and Economic Development Department
Planning and Infrastructure Approvals Branch
110 Laurier Avenue West, 4th Floor
Ottawa ON, K1P 1J1

Attention: **Amanda Davidson, Planner I, Development Review West**

Reference: **Copperwood Flats – Block 125**
Servicing and Stormwater Management Report
Our File No.: 122144

Please find enclosed the 'Servicing and Stormwater Management Report' for the above noted development located in the City of Ottawa. This report is being submitted in support of the site plan application for the proposed development.

Should you have any questions or require additional information, please contact the undersigned.

Yours truly,

NOVATECH

Anthony Mestwarp, P. Eng.
Project Manager, Land Development

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

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Appendices

Tables

Figures

1.0 INTRODUCTION

Novatech has been retained to prepare a Servicing and Stormwater Management Report for the proposed site plan located within the City of Ottawa. The proposed site is denoted as Block 125 within 1053, 1075 and 1145 March Road Copperwood Estates Subdivision and is presently named Copperwood Flats. The purpose of this report is to support the site plan application for the subject development. **Figure 1** Key Plan shows the site location.

1.1 Existing Conditions

The subject site is approximately 0.55 hectares (ha.) in size and is denoted as Block 125 of the Copperwood Estates Subdivision. Presently the site consists of vacant and undeveloped land.

The site is bound by rue Spoor Street to the west, Buckbean Avenue to the North, Copperwood Estates Subdivision SWM Pond to the east, and Block 126 - Shirley's Brook Northwest branch to the west. The site primarily drains from the west to east with a +/- 2.3m grade differential across the site. **Figure 2** shows the existing site conditions.

The Copperwood Estates subdivision development was designed by Novatech and information is provided in the following report:

- '1053, 1075 and 1145 March Road Copperwood Estate - Detailed Site Servicing and Stormwater Management Report (Phase 1) By Novatech dated May 19th, 2023 – 4th Submission' (Referenced as **Copperwood Estates Report**).

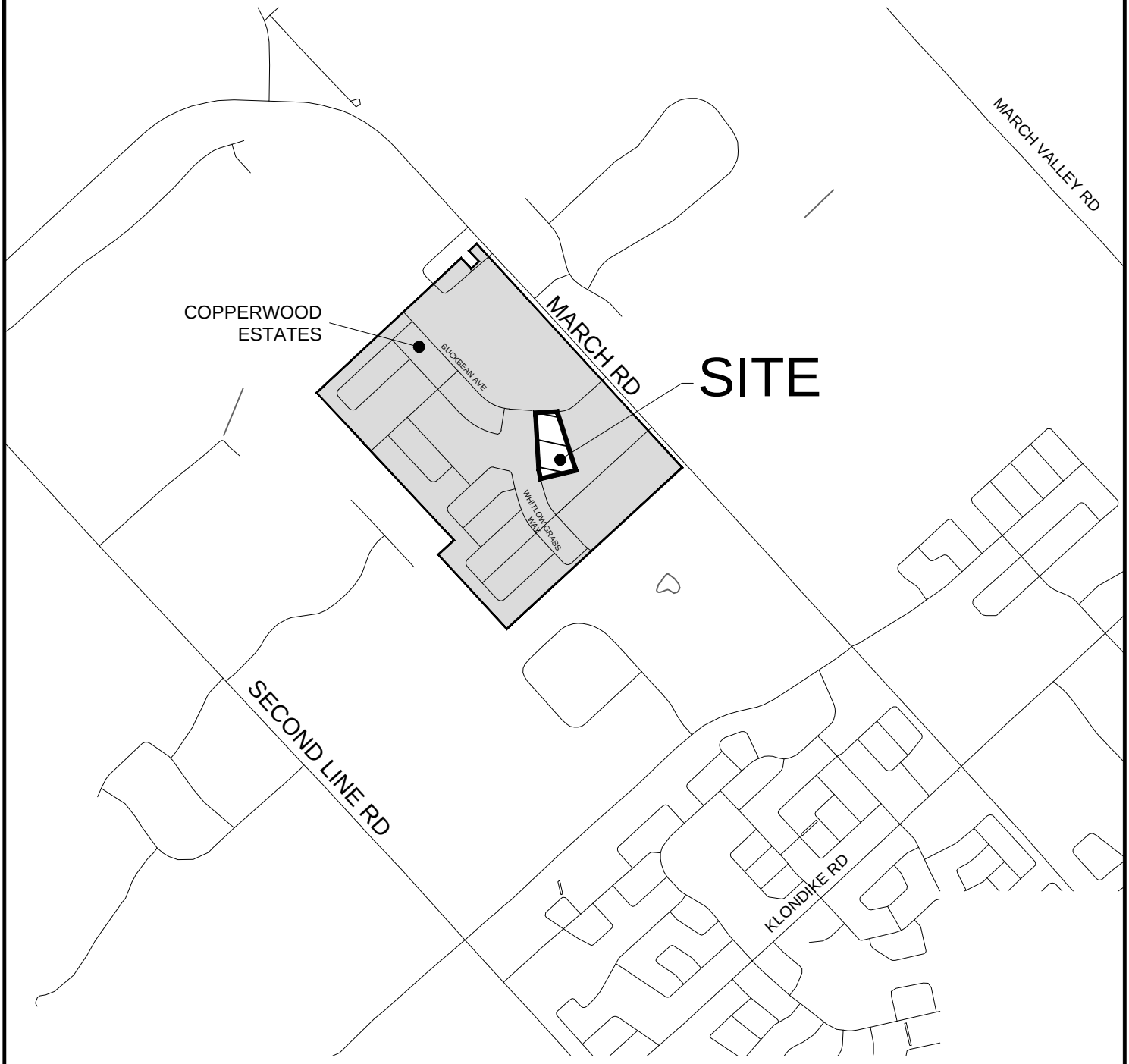
1.2 Proposed Development

It is proposed to develop the site with three (3) low rise stacked buildings complete with above ground parking. The buildings will have individual footprints of 447m^2 and a total of 36 dwelling units. Vehicular access to the site will be provided from Rue Spoor Street while pedestrian access will be provided from both Rue Spoor Street and Buckbean Avenue. **Figure 3** shows the concept plan for the proposed development. Correspondence from the City pre-consultation meeting for the proposed development is also included in **Appendix A** for reference.

2.0 SITE CONSTRAINTS

A geotechnical investigation was completed for the Copperwood Flats development, and a report prepared entitled 'Geotechnical Investigation, Proposed Residential Building Development, Copperwood Flats Block 125, 1075 March Road, Ottawa Ontario prepared by Paterson Group Inc. dated February 7, 2025 (PG6613-1)'. The following is a summary of the findings of the report:

- Practical refusal to excavation equipment on bedrock surface was encountered at all test hole locations at depths ranging between 0.7 to 3.1m below existing ground surface.
- Based on available geological mapping, and refusal to excavation, the bedrock in the subject area consists of sandstone and dolomite of the March Formation, with an overburden thickness of 1 to 3m depth.
- Groundwater infiltration levels were recorded in the open test holes upon completion of the current investigation program. The test holes were noted to be generally dry. It should be noted that groundwater levels are subject to seasonal fluctuations. Therefore,



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CITY OF OTTAWA
COPPERWOOD FLATS LOW-RISE APARTMENTS - BLOCK 125

KEY PLAN

SCALE		
N.T.S		
DATE	JOB	FIGURE
MAR 2025	122144	FIGURE 1

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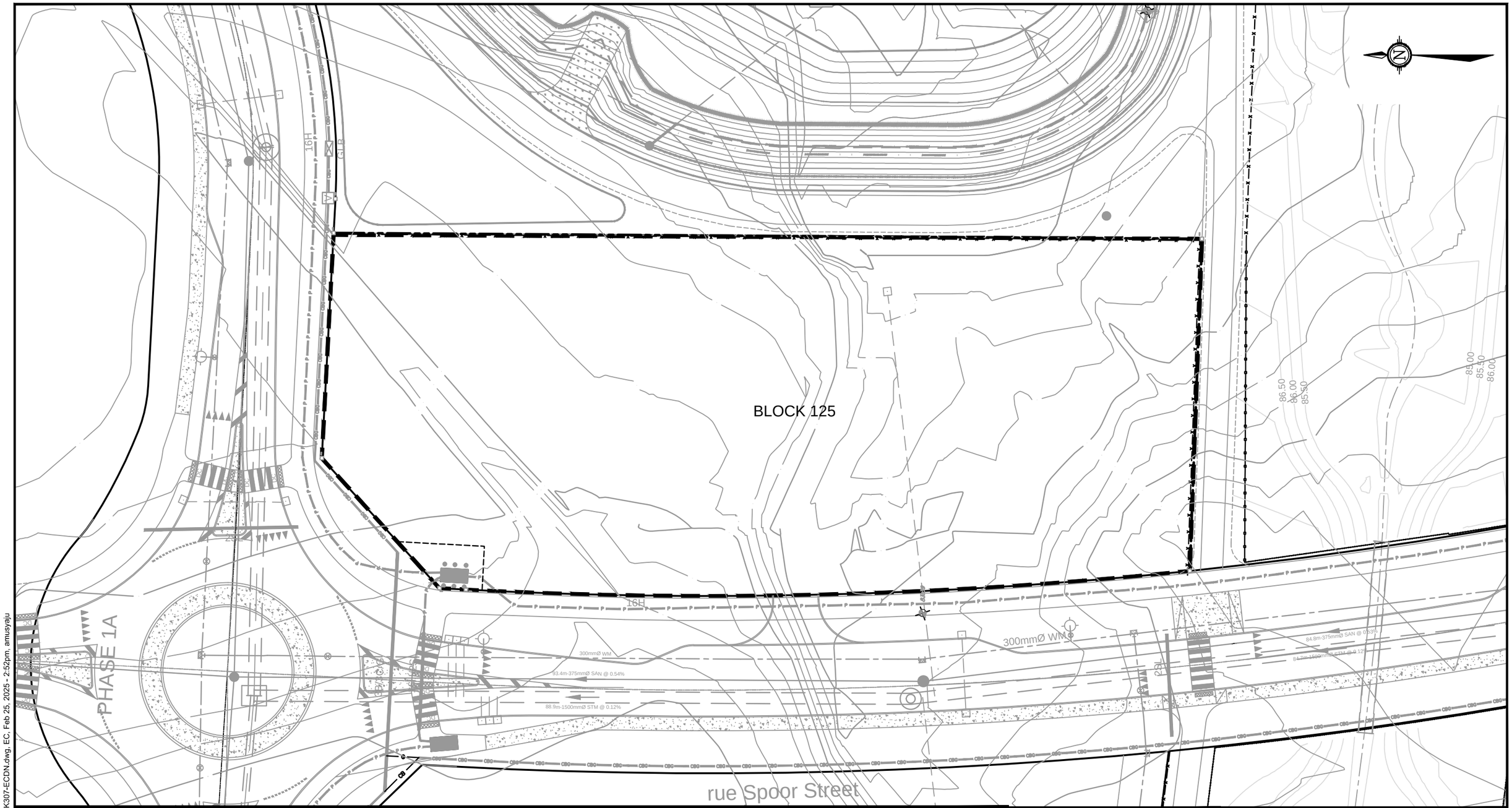
SHT8X11.DWG - 216mmx279mm



LEGEND

SITE BOUNDARY

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CITY OF OTTAWA
COPPERWOOD FLATS LOW-RISE APARTMENTS - BLOCK 125

EXISTING CONDITIONS

SCALE 1 : 500 (0, 5m, 10m, 20m)

DATE SEP 2024 | JOB 122144 | FIGURE FIGURE 2

SHT11X17.DWG - 279mmX432mm

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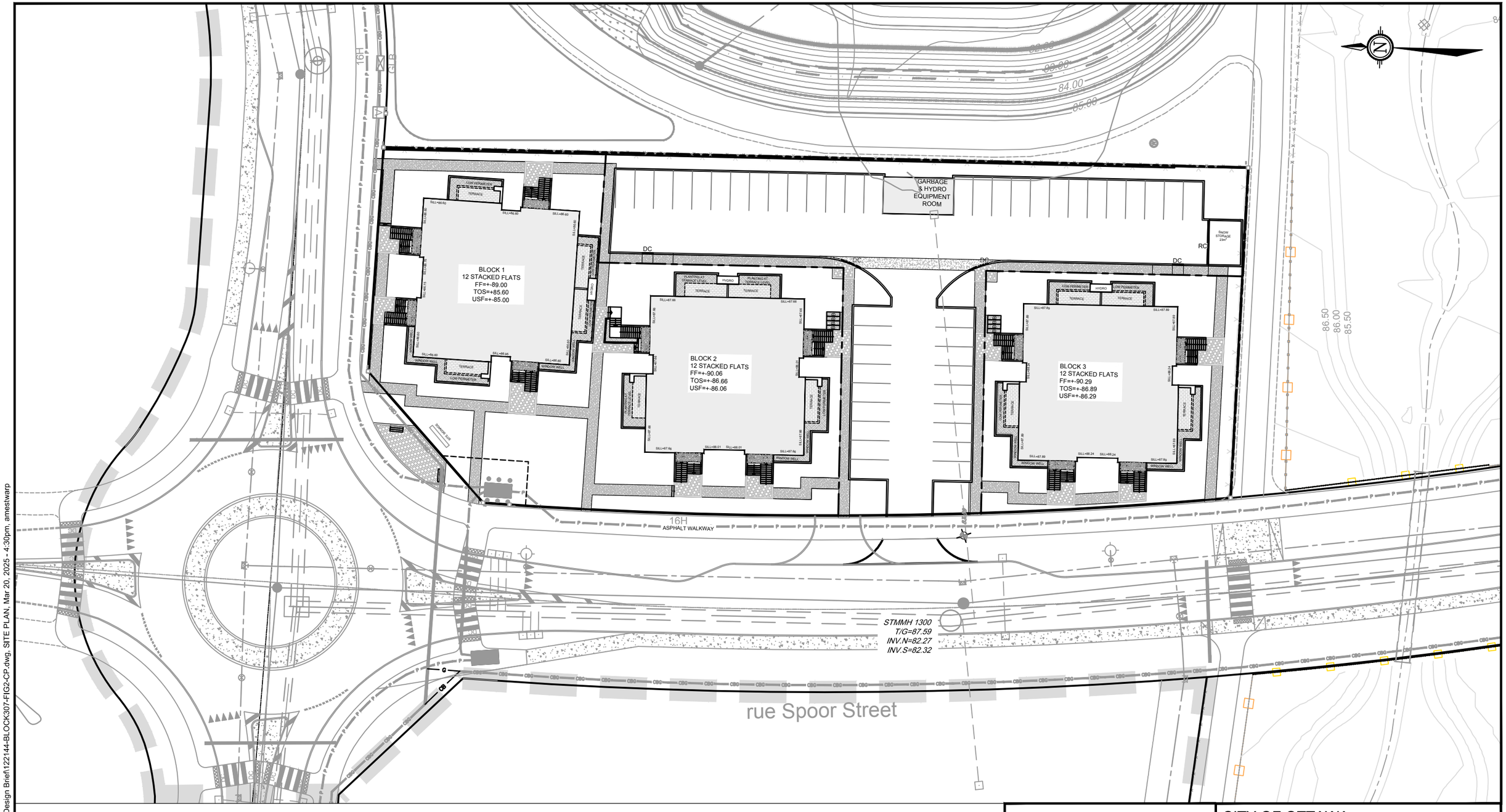

M:\2022\122144\BLOCK 307\CAD\Civil\Figures\Design Brief\122144-BLOCK307-FIG2-CP.dwg, SITE PLAN, Mar 20, 2025 - 4:30pm, amestwarp

LEGEND

SITE BOUNDARY

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CITY OF OTTAWA
COPPERWOOD FLATS
LOW-RISE APARTMENTS - BLOCK 125

SITE PLAN

SCALE 1 : 500 (0, 5m, 10m, 20m)

DATE MAY 2025 | JOB 122144 | FIGURE FIG-3

SHT11X17.DWG - 279mmX432mm

the groundwater level could vary at the time of construction but is expected at an approximate elevation between 81.5 and 82.5m.

- Due to the presence of a silty clay deposit at the subject site, a permissible grade raise restriction is required for the proposed development where the silty clay layer is present below the building footprint.
- Based on the undrained shear strength values of the silty clay deposit encountered within the subject site, a permissible grade raise restriction of 3.0 m is recommended for the site. Footings bearing on bedrock are not subjected to permissible grade raise restrictions.
- A temporary Ministry of the Environment, Conservation and Parks (MECP) permit to take water (PTTW) may be required for this project if more than 400,000 L/day of ground and/or surface water is to be pumped during the construction phase. A minimum 4 to 5 months should be allowed for completion of the PTTW application package and issuance of the permit by the MECP.
- For typical ground or surface water volumes being pumped during the construction phase, typically between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan to be prepared by a Qualified Person as stipulated under O.Reg. 63/16.

3.0 WATER SERVICING

There are existing City watermains in all rights-of-way fronting the proposed site. There is an existing 300mm PVC diameter (dia.) watermain within Rue Spoor Street and a 300mm PVC dia. watermain within Buckbean Avenue.

It is proposed to service the development with a private watermain which will connect to the existing 300mm diameter watermain within rue Spoor Street in two (2) locations. The site will be serviced internally with 38mm services to water entry rooms beneath the entry staircases at each building. Each 38mm waterline will service 3 dwelling units with 4 services (12 units) per building.

Water demand calculations have been calculated using criteria from Section 4 of the City of Ottawa Water Distribution Guidelines and the Ontario Building Code. The required fire demand was calculated using the Fire Underwriters Survey (FUS) Guidelines.

<u>Demand Values:</u>

- Residential Demand = 280L/capital/day
- Residential Max Day = 2.5 x Avg. Day
- Residential Peak Hour = 2.2 x Max. Day
- Population Density
    - 2.1 persons/unit (2 Bed Apartments/Stacked Towns)
        - 2.1 persons per unit utilized as stacked towns are all one storey with two bedrooms.
- Fireflows
    - 217.0 L/s. Typical unit fireflow can be found in **Appendix B**.
    - Calculation method as per Technical Bulletin ISTB-2018-02 and FUS 2020.

System Requirements

- Max. Pressure (Unoccupied Areas) 690 kPa (100 psi)
- Max. Pressure (Occupied Areas) 552 kPa (80 psi)
- Min. Pressure 276 kPa (40 psi) excluding fire flows
- Min. Pressure (Fire) 138 kPa (20 psi) including fire flows

Friction Factors:

Watermain Size	C-Factor
• 150mm	100
• 200-250 mm	110
• 300-400 mm	120

Water demand and fire flow calculations are provided in **Appendix B** for reference. A summary of the water demand and fire flows are provided in **Table 3.1**.

Table 3.1: Domestic Water Demand Summary

Population	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
76	0.25	2.33	3.50	217

Note as per ITSB 2018-02 the fire flow was distributed among several surrounding hydrants during modelling as outlined in **Table 3.2**.

Table 3.2: Maximum Flow to be considered from a given hydrant.

Hydrant Class	Distance to building (m)	Contribution to Fire Flow	
		(L/min)	(L/s)
AA	≤75	5700	95
	>75and ≥150	3800	63.33
A	≤75	3800	63.33
	>75and ≥150	2850	47.50
B	≤75	1900	31.67
	>75and ≥150	1500	25.00
C	≤75	800	13.33
	>75and ≥150	800	13.33

For the purpose of the model, and in light of the available pressures, it was assumed offsite Hydrants would be rated as class AA. As the Fire flow is calculated as 217L/s, three (3) hydrants

will be required to achieve the required flow. There are presently two (2) existing class AA Hydrants along the east side of Rue Spoor Street, and one (1) hydrant on the North side of Buckbean Avenue. Additionally, one (1) private hydrant is proposed in the south-east corner of the subject site. Thus four (4) AA hydrants will be within 150m of each proposed building capable of providing a combined total flow of 217 L/s of flow as per **Table 3.2.** Refer to **Appendix B** for calculations and the Hydrant Coverage figure.

The above demands were inserted into the EPA Net hydraulic model for the Copperwood Estates Subdivision for analyzing the performance of the proposed watermain system for three theoretical conditions: 1) High Pressure check under Average Day conditions, 2) Peak Hour demand, 3) Maximum Day + Fire Flow Demand.

Refer to **Table 3.3** for a summary of the boundary conditions and hydraulic analysis.

Table 3.3: Water Boundary Conditions and Hydraulic Analysis Summary

Condition	Demand (Block 125) (L/s)	Min/Max Allowable Operating Pressures (psi)	Limits of Design Operating Pressures (psi)
High Pressure	0.25 L/s	80psi (Max)	63psi (Block 125)
Maximum Daily Demand and Fire Flow	219.33 L/s	20psi (Min)	38psi (Block 125)
Peak Hour	3.50 L/s	40psi (Min)	49psi (Block 125)

Based on the preceding analysis it can be concluded that the existing watermain system will provide adequate system pressures and flows to service the proposed development. Refer to **Appendix B** for detailed model results, schematics of the model and boundary conditions.

4.0 SANITARY SERVICING

There is an existing 375mm PVC diameter sanitary sewer within rue Spoor Street Road right-of-way, and a 375mm PVC diameter sanitary sewer within Buckbean Avenue that was installed as part of the **Copperwood Estates Subdivision**.

It is proposed to service the proposed development with a 200mm diameter private sanitary sewer which will connect to an existing 1200mm diameter sanitary manhole within rue Spoor Street. The site will be serviced internally with 135mm services to water entry rooms beneath the entry staircases at each building. Each 135mm sanitary service will service 3 dwelling units with 4 services (12 units) per building.

Sanitary flows for the proposed development were calculated using criteria from Section 4 of the City of Ottawa Sewer Design Guidelines and the Ontario Building Code as follows:

- Residential Average Flow = 280 L/capita/day
- Population Density
    - 2.1 persons/unit (2 Bed Apartments/Stacked Towns)
        - 2.1 persons per unit utilized as stacked towns are all one storey with two bedrooms.

- Residential Peaking Factor = Harmon Equation (max peaking factor = 4.0)
- Commercial Peaking Factor = 1.0
- Peak Extraneous Flows (Infiltration) = 0.33L/s/ha

The peak sanitary flow including infiltration for the development was calculated to be **1.07 L/s**. Detailed sanitary flow calculations are provided in **Appendix C** for reference.

As noted previously, the detailed design of the **Copperwood Estates Subdivision** was completed by Novatech with details provided within the Report. The Subdivision design assumed that Block 125 & Block 284 was to be a residential development area for a total assumed population of 232. The design criteria are summarized below, and excerpts from the report are included within **Appendix C** for reference.

- Average Daily Flow = 280 L/capita/day
- Residential Peaking Factor = Harmon Equation (max peaking factor = 4.0)
- Commercial/ Institutional Peaking Factor = 1.0
- Peak Extraneous Flows (Infiltration) = 0.33L/s/ha

The resultant flow for Block 125 & Block 284 was calculated to be **4.0 L/s**. The combined area of Block 125 and Block 284 is **1.71ha**. Therefore, the allotment of flow associated with the **0.55ha** Block 125 (based percentage of area) is **1.28 L/s**. The assumed design flow was higher than currently proposed, thus the existing infrastructure within the Copperwood Estates Subdivision has capacity to service the proposed development.

5.0 STORM SERVICING

There is a 1500mm concrete storm sewer located within Rue Spoor Street right-of-way fronting to the proposed development and a 1650mm concrete storm sewer located within Buckbean Avenue right-of-way as apart of the **Coppwerwood Estates Subdivision**.

It is proposed to provide storm sewers within the development and connect to an existing storm manhole within rue Spoor Street. The proposed storm sewers will vary in size ranging from 250mm to 450mm in diameter, with 750mm diameter underground storage pipes to control peak flows. The site will be serviced internally with 100mm services to water entry rooms beneath the one entry staircases at each building. Each 100mm storm service will service the foundation drainage system of the proposed building. The proposed roof is peaked, and roof drainage will be directed to downspouts that will discharge to the surface.

The design criteria used in sizing the storm sewers are summarized below in **Table 5.1.**

Table 5.1: Storm Sewer Design Parameters

Parameter	Design Criteria
Local Roads	2 Year Return Period
Storm Sewer Design	Rational Method
IDF Rainfall Data	Ottawa Sewer Design Guidelines
Initial Time of Concentration (Tc)	10 min
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250 mm

Refer to **Appendix D** for detailed storm drainage area plans and storm sewer design sheets.

6.0 STORM DRAINAGE AND STORMWATER MANAGEMENT

The stormwater management strategy for the site is based on the established criteria from the City of Ottawa, and the **Copperwood Estates Subdivision** Report.

6.1 Design Criteria

Through correspondence with the City of Ottawa, the **Copperwood Estates Subdivision** Report and our knowledge of development requirements in the area, the following criteria have been adopted to control post-development stormwater discharge from the site:

- Control proposed development flows, up to and including the 100-year storm event, to an allowable release rate of **117.6L/s**
- Provide source controls which are in conformity with the City of Ottawa requirements, where possible;
- Limit ponding to 0.15 m for all rooftop storage areas and 0.30 m for all parking storage areas;
- Quality control will be provided by the downstream SWM pond associated with **Copperwood Estates Subdivision**.
- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

The approach to the stormwater management design is to determine the allowable release rate for the site, calculate the uncontrolled flow, and ensure that the remaining flow, in combination with the uncontrolled flow, does not exceed the allowable release rate. All proposed development runoff in excess of the allowable release rate, will be attenuated on-site prior to being released into the storm sewers within rue Spoor Street.

6.2 Quantity Control

The allowable release rate for the 0.580 ha catchment was calculated to be **117.6 L/s** based on the SWM criteria provided by the City of Ottawa, and the **Copperwood Estates Subdivision** Report. Excerpts from the report are included within **Appendix C** for reference.

Design Storms

The design storms are based on City of Ottawa design storms. Design storms were used for the 5, 100, and 100+20%-year return periods (i.e. storm events).

Model Parameters

Post-development catchments were analyzed utilizing the rational method based on the proposed site plan and grading as shown on **Drawing 122144-SWM** within **Appendix D**.

The site has been divided into nine (9) drainage areas for the post development condition. The drainage areas are as follows:

Area A-01 & A-02

- Flows from the proposed parking area abutting the existing SWM facility, and rear portion of the stacked town roofs will be conveyed to the existing storm sewer in rue Spoor Street. These flows will be captured by catchbasins manholes, and conveyed to a 750mm diameter pipe. Flows from the manholes will be conveyed by superpipe and controlled by an inlet control device (ICD). Additional storage will be provided within the parking area.

Area A-03 & A-04

- Flows from the stacked town roofs and outdoor amenity area will be conveyed to the existing storm sewer in rue Spoor Street. These flows will be captured by a catchbasins manhole, and a landscape drain. Flows will be conveyed by superpipe and controlled by an inlet control device (ICD), with storage provided underground within the superpipe and above ground within the amenity area.

Area A-05

- Flows from the proposed central parking area, and stacked town roofs will be conveyed to the existing storm sewer in rue Spoor Street. These flows will be captured by a catchbasin. Flows will be conveyed by storm sewer and controlled by an inlet control device (ICD). Surface storage is provided in parking area.

Area D-01:

- A portion of the drainage along the east frontage of the property and Block 1 roof will flow uncontrolled to the **Copperwood Estates Subdivision** SWM Pond.

Area D-02:

- The drainage along the north frontage of the property and Block 1 roof will flow uncontrolled to the Buckbean Avenue right-of-way, where it will be captured by the existing storm system apart of **Copperwood Estates Subdivision**.

Area D-03

- A portion of the drainage along the west frontage of the property and Block 3 roof will flow uncontrolled to the rue Spoor Street right-of-way, where it will be captured by the existing storm system apart of **Copperwood Estates Subdivision**.

Area D-04:

- A portion of the drainage along the south frontage of the property and Block 3 roof will flow uncontrolled to Block 126 - Shirley's Brook Northwest branch, where it will be captured by the existing storm system apart of **Copperwood Estates Subdivision**.

Table **6.1 below** summarizes the flow, storage required, and storage provided for each of the site drainage areas.

Table 6.1: Stormwater Management Summary

Area ID	Area (ha)	1:5 Year Weighted Cw	1:100 Year Weighted Cw	Control Device	Outlet Location	2 Year Storm Event				5 Year Storm Event				100 Year Storm Event			
						Release (L/s)	Head (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)	Release (L/s)	Head (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)	Release (L/s)	Head (m)	Req'd Vol (cu.m)	Max. Vol. Provided
D-01	0.037	0.51	0.58	N/A	SWMF	4.00	N/A	N/A	N/A	5.40	N/A	N/A	N/A	10.50	N/A	N/A	N/A
D-02	0.037	0.63	0.71	N/A	Buckbean Avenue	4.90	N/A	N/A	N/A	6.60	N/A	N/A	N/A	12.80	N/A	N/A	N/A
D-03	0.031	0.65	0.71	N/A	Spoor Street	4.30	N/A	N/A	N/A	5.80	N/A	N/A	N/A	11.30	N/A	N/A	N/A
D-04	0.031	0.68	0.76	N/A	Shirleys Brook	4.50	N/A	N/A	N/A	6.10	N/A	N/A	N/A	11.70	N/A	N/A	N/A
D-05	0.026	0.57	0.64	N/A	Shirleys Brook	3.10	N/A	N/A	N/A	4.20	N/A	N/A	N/A	8.20	N/A	N/A	N/A
A-01-02 (CBMH 213)	0.218	0.78	0.88	Plate Oriface Dia 94	Spoor Street	13.80	0.52	21.78	60.86	16.60	0.77	31.09	60.86	29.72	2.40	60.85	60.86
A-03-04 (STMMH 206)	0.115	0.61	0.69	LMF 75	Spoor Street	4.40	0.78	10.12	32.97	5.00	0.98	14.63	32.97	8.20	2.69	29.93	32.97
A-05 (CB 209)	0.082	0.80	0.89	Plate Oriface Dia 102	Spoor Street	14.09	0.400	0.00	8.72	19.12	0.720	0.00	8.72	25.20	1.280	6.82	8.72
Post-Development Flow						**53.1**	**-**			**68.8**	**-**			**117.6**	**-**	**97.6**	
Total Allowable Release Rate						**117.6**				**117.6**				**117.6**			

Refer to **Appendix D** for Rational Method calculations and **Drawing SWM**-Stormwater Management Plan.

6.3 Quality Control

Quality control will be provided by the existing downstream SWM Pond for the **Copperwood Estates Subdivision**.

6.4 Major Overland Flow Route

A major overland flow route will be provided for storms greater than the 100-year storm event. Stormwater will be directed to the surrounding rights-of-way, and the SWM Pond for the **Copperwood Estates subdivision**. The major overland system is shown on the Grading Plan (drawing 122144-GR).

7.0 EROSION AND SEDIMENT CONTROL

Temporary erosion and sediment control measures will be implemented on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter socks (catchbasin inserts) will be placed in existing and proposed catchbasins and catchbasin manholes, and will remain in place until vegetation has been established and construction is completed;
- Silt fencing will be placed along the surrounding construction limits;
- Mud mats will be installed at the site entrances;
- The contractor will be required to perform regular street sweeping and cleaning as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site;

Erosion and sediment control measures should be inspected daily and after every rain event to determine maintenance, repair or replacement requirements. Sediments or granulars that enter site sewers shall be removed immediately by the contractor. These measures will be implemented prior to the commencement of construction and maintained in good order until vegetation has been established. Refer to the Erosion and Sediment Control Plan (drawing 122144-ESC) for additional information.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Watermain

The analysis of the existing and proposed watermain network confirms the following:

- The proposed 150mm dia. private watermain which connects to the existing 300mm watermain within rue Spoor Street can service the proposed development.
- There are adequate pressures in the existing watermain infrastructure to meet the required domestic demands for the development.
- There is adequate flow to service the proposed fire protections system.

Sanitary Servicing

The analysis of the existing and proposed sanitary system confirms the following:

- It is proposed to service the development with a proposed 200mm private sanitary sewer which will connect to the existing manhole within the rue Spoor Street right-of-way.
- It is anticipated there is adequate capacity within the existing sanitary infrastructure to service the development.

Stormwater Management

The following provides a summary of the storm sewer and stormwater management system:

- The proposed private storm sewer system is to connect to the storm sewers within in the rue Spoor Street right-of-way.
- Storm flows will be attenuated through the implementation of inlet control devices.
- As per existing conditions a major overland flow routes have been provided to the surrounding rights-of-way.
- Quality control is provided by the existing downstream SWM facility.

Erosion and Sediment control

- Erosion and sediment control measures (i.e. filter fabric, catch basin inserts, silt fences, etc.) will be implemented prior to construction and are to remain in place until vegetation is established.

9.0 CLOSURE

The preceding report is respectfully submitted for review and approval. Please contact the undersigned should you have questions or require additional information.

NOVATECH

Prepared by:

Curtis Ferguson, EIT
Engineering Intern
Land Development Engineering

Reviewed by:

Anthony Mestwarp, P.Eng
Project Manager
Land Development Engineering

Appendix A
Pre - Consultation Meeting Minutes

File No.: PC2024-0316

October 11, 2024

Robert Tran
Novatech Engineering
Via email: r.tran@novatech-eng.com

Subject: **Phase 2 Pre-Consultation: Meeting Feedback and City Response to Novatech Pre-Consultation Response Letter September 17, 2024 Proposed Site Plan Control Application – 1053, 1075, 1145 March Road**

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on August 16, 2024.

Pre-Consultation Preliminary Assessment

1 ☐	**2** ☐	**3** ☒	**4** ☐	**5** ☐

One (1) indicates that considerable major revisions are required while five (5) suggests that the proposal appears to meet the City's key land use policies and guidelines. This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.

Next Steps

1. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. Please consider proceeding to a Phase 3 pre-consultation. Fill in the Pre-consultation Application Form and submit it together with the necessary studies and/or plans to planningcirculations@ottawa.ca.

2. In your subsequent submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed must be included with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.

3. Please note, if your development proposal changes significantly in scope, design, or density, you may be recommended to complete or repeat the pre-consultation process before filing an Official application.

Supporting Information and Material Requirements

1. The attached **Study and Plan Identification List** outlines the information and material that has been further identified and/or confirmed, during this phase of pre-

consultation, as required (R) or advised (A) as part of a future complete application submission.

a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

Consultation with Technical Agencies

1. You are encouraged to consult with technical agencies early in the development process and throughout the development of your project concept. A list of technical agencies and their contact information is enclosed.

Proposed Development

1. Planned Unit Development consisting of three (3) twelve (12) unit stacked townhouses within the Copperwood Estates Subdivision in Kanata North.

Planning

List of Studies and Plans Reviewed:

- **Copperwood Kanata Stacked Flats Study,** prepared by Hobin Architecture, July 2024.
- **Site Plan**, SP-1, prepared by Hobin Architecture, dated July 29, 2024.

Deficiencies:

1. An updated Study and Plan Identification list has been provided. Please ensure that required studies and plans are submitted with a formal application. Staff will require additional information (elevations, etc.) in order to comment on specific policies and zoning conformity.

2. Please be advised that until the corresponding draft approved subdivision is registered, the site will not be considered zoning compliant. Until such time as the subdivision is registered, the site does not have legal access or servicing and will not comply with Section 56 and Section 59 of the Zoning By-law.

    a. Additionally, please be advised that the site will not be considered zoning compliant until the holding provision is lifted. No construction is permitted prior to the lifting of the hold.

3. Please confirm setback from Block 3 to the relocated Shirley's Brook Northwest Branch (Tributary #2) as per Section 69 of the zoning by-law (Setbacks from Watercourses and Waterbodies).

    a. Subsection 3 states that "Development requiring a plan of subdivision or that is subject to site plan control must provide the watercourse or waterbody setbacks set forth in subsection (2) unless, as established through conditions of approval, a different setback is determined to be appropriate in accordance with the criteria set forth in the Official Plan. (By-law 2009-347)".

    b. Setback should be reflected on the subsequent submission.

Novatech Pre-Consultation Response Letter, September 17 2024:

The Shirley's Brook Tributary has been realigned as part of the approved Copperwood Estates Subdivision (City File No.: D07-16-18-0023 and D02-02-18-0076). A 40 metre wide realigned corridor is being provided in accordance with the City Council approved Kanata North Community Design Plan (2016) and Environmental Management Plan (2016). The approved Combined Environmental Impact Statement and Tree Conservation Report (Revised) prepared by McKinley Environmental Solutions dated November 2019 addresses the realignment of the tributary and setback from this feature. Specifically in Section 4.2.1 Tributary Setbacks of the report,

> "As specified in Section 4.7.3 of the City of Ottawa Official Plan, current policy recommends that the setback from watercourses should be the greater of either 15 m from the top of slope or 30 m from the normal high-water mark of the watercourse. The minimum 40 m wide corridor surrounding the tributaries of Shirley's Brook established by the KNUEA EMP effectively requires implementation of a 20 m setback from the watercourses. The City of Ottawa Official Plan Policy 4.7.3 identifies four (4) items that are to be addressed in cases where watercourse setbacks are less than 30 m from the normal high-water mark.
> A. Slope and Bank Stability: The realigned North Tributary of Shirley's Brook will be designed to minimize erosion potential. Tree planting within the setbacks (discussed below in Section 4.2.4), will help to stabilize the slope and prevent future erosion. No significant slope and bank stability issues have been identified.
> B. Natural Vegetation and Ecological Functions in the Setback Area: As discussed above, under existing conditions the majority of the North Tributary lacks riparian tree cover. During the realignment process, vegetation cover within the watercourse corridor will be enhanced, thereby improving the quality of the habitat above existing conditions.
> C. The Nature of the Abutting Waterbody and the Presence of the Floodplain: The floodplain of the North Tributary will be confined within the minimum 40 m wide watercourse corridor following development of the Site (Novatech 2016b).
> D. No Negative Impacts on Fish Habitat: As discussed above, the North Tributary currently provides low quality, intermittent fish habitat for a tolerant warm-water

fish community (MES 2019a). As described below, the realignment process will include habitat restoration works, which will improve the quality of fish habitat above existing conditions.

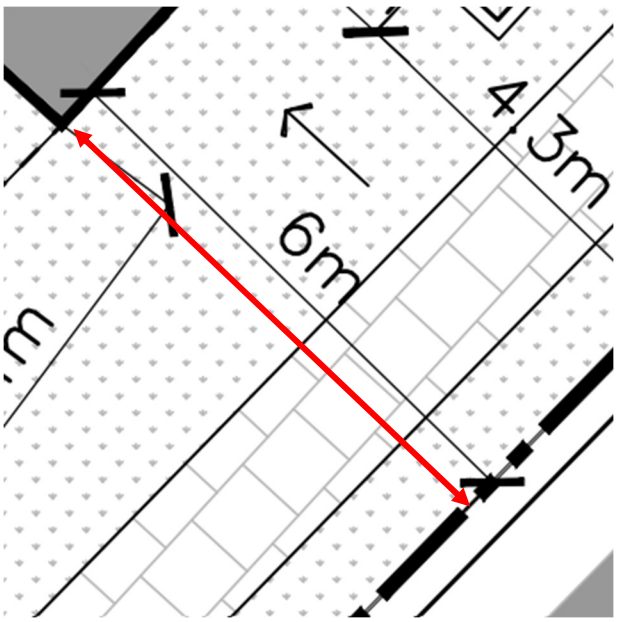
In summary, the minimum 40 m wide corridor surrounding the realigned North Tributary is anticipated to be sufficient to protect the ecological functions of the watercourse. As part of the realignment process, habitat restoration and habitat enhancement works will be undertaken, which will improve the quality of the aquatic habitat above existing conditions".

Based on the above, no further setbacks from the realignment of the Shirley's Brook Tributary #2 will be required from the proposed development.

City Response: Acknowledged.

4. Please provide the width of the parking spaces between Block 2 and Block 3 to confirm conformity with the zoning by-law.

5. Ensure setbacks are dimensioned from the closest point of the building to the property line. See image below regarding the rear yard setback for Block 3, please confirm the shortest dimension.

a. 

6. The lockers located on the balconies are not permitted projections within Section 65 of the zoning by-law, and are considered part of the main building footprint. Please review and ensure compliant setbacks are provided, with reference to the rear yard setback for Block 3. The lockers do not currently comply with a minimum rear yard setback of 6 meters.

a. 

Comments:

7. Official Plan

    a. The subject lands are located within the Suburban transect and are designated Neighbourhood with an Evolving Neighbourhood overlay as per Schedule A and Schedule B5, respectively.

    b. The subject lands are located within the Kanata North Community Design Plan area. Within the design brief, please include discussion regarding the proposal's consideration of the vision and objectives of the Kanata North Community Design Plan.

    c. There are no secondary plans applicable to the site.

    d. The site is subject to an area specific policy as indicated in Annex 5, specifically Area Specific Policy 6 - Kanata North.

        i. Volume 2C – Area Speific Policies, Policy #6 Kanata North

            1. Council has approved the Kanata North Community Design Plan (CDP) to guide future development. Development is therefore to occur in keeping with the CDP and policies within the Official Plan, subject to the following:

                a. Residential development is to be not more than 55 per cent single detached dwellings, at least 10 per

cent apartment dwellings and the remainder multiple dwellings, other than apartments; and

b. The overall residential development will meet the minimum average density target of 36 units per net hectare. Net residential density is based on the area of land exclusively for residential use, including lanes and parking areas internal to developments but excluding public streets, right of way and all non-residential uses.

2. Landowners within the boundary of the Kanata North Community Design Plan, approved by Council, shall enter into private agreement(s) to share the costs of the major infrastructure projects and associated studies and plans required for the development of the Kanata North Urban Expansion Area (UEA). In addition, the landowners shall enter into private agreement(s) to share the dedication and costs of development of parkland.

   Such agreement(s) are initiated by the landowners within the defined Kanata North UEA and provide for the fair sharing of costs among the benefiting parties, to complement or replace the provisions of a Development Charges By-law. Each agreement shall contain a financial schedule describing the estimated costs of the major infrastructure projects or parkland requirements and associated studies and plans, as well as the proportionate share of the costs for each landowner. The City will require the execution of the agreement(s) by each landowner prior to the approval of any application by the landowner for draft plan of subdivision or condominium, conditional approval of a severance, or approval of site plan control. The City shall include, as a condition of approval for all plans of subdivision and condominium, site plan and severance applications in Kanata North UEA, requiring notification from the Trustee of the Kanata North Landowners Group that the owner is party to the agreement(s) and has paid its share of any costs pursuant to the agreement(s).

ii. Please include discussion of Special Policy 6 within the planning rationale.

Novatech Pre-Consultation Response Letter, September 17 2024:

As per the City of Ottawa's approved Terms of References for Planning Rationales, a Planning Rationale is not required for Site Plan Control applications. Nonetheless, an

acknowledgement that the Subject Site is situated within the Special Policy 6 of the City of Ottawa Official Plan will be referenced in the cover letter.

City Response: Acknowledged. A Planning Rationale is not required for the site plan control application.

8. Section 4.8.2 within the Official Plan requires that development accommodate space for tree planting. Please ensure that the landscaping plan illustrates tree planting options.

    a. Please consider opportunities to include planting along the southern boundary of the site adjacent to the tributary, as per the environmental comments below, to further assist with protecting the naturalized corridor.

9. Policy 9 of Section 4.1.2 outlines that proponents of development shall provide an adequate number of bicycle parking facilities, and identifies associated requirements for short- and long-term bicycle parking.

    a. Please consider whether there are opportunities to provide bicycle parking on-site for future residents.

10. Policy 3 of Section 4.6.5 states that development shall minimize conflict between vehicles and pedestrians and improve the attractiveness of the public realm by internalizing all servicing, loading areas, mechanical equipment and utilities into the design of the building, and by accommodating space on the site for trees, where possible. Policy 3 further states that where underground parking is not viable, surface parking must be visually screened from the public realm.

    a. For the parking lot between Block 2 and 3, please demonstrate on the landscaping plan how the site will be screened from Spoor street.

    b. Consider opportunities to relocate the parking lot between Block 2 and 3 to the east of the buildings, rather than fronting on Spoor Street.

11. Policy 11 of Section 4.1.4 outlines requirements for surface parking lots, including regular spacing of tree islands that support the growth of mature shade trees.

    a. Consider opportunities to provide additional tree planting within the surface parking, as per Forestry comments below and reducing heat island effect.

12. Zoning

    a. The subject lands are zoned R4Z[2818]-h (Residential Fourth Density, Subzone Z, Urban Exception 2818, subject to a holding provision).

i. The R4Z zones permits low-rise residential uses. Planned Unit Development and Dwelling, Stacked are permitted uses within the R4Z zone.

b. The site is currently subject to a holding provision, as indicated within the text of Urban Exception 2818. No construction of buildings is permitted prior to the removal of the holding symbol.

i. Urban Exception 2818 states that the holding provision shall not be removed until the following conditions are satisfied:

1. Approval of detail design for the stormwater management pond and Shirley's Brook Tributary 2 realignment and restoration plan within the 1053, 1075 and 1145 March Road subdivision;

2. Submission of an Environmental Compliance Approval application to the Ministry of Environment, Conservation and Parks for the stormwater management pond within the 1053, 1075 and 1145 March Road subdivision;

3. Written permission from Mississippi Valley Conservation Authority based on Ontario Regulation 153/06 for the works outlined in item 1. above; and

4. Provision of updated floodplain mapping for the Shirley's Brook Tributary 2 to the City of Ottawa by the Mississippi Valley Conservation Authority illustrating removal of the floodplain from the lot.

ii. As noted in Comment #2, please be advised that the site plan will not be considered zoning compliant until the holding provision is lifted.

Novatech Pre-Consultation Response Letter, September 17 2024:

It should be noted that Items #1-3 have been completed with Item #4 ongoing as discussions are taking place between the MVCA and Novatech on the requirement to update the floodplain mapping.

City Response: Acknowledged.

13. Parking Requirements

a. The minimum parking rates identified for Area D on Schedule 1A in Table 101 of the Zoning By-law apply:

i. Planned Unit Development – as per dwelling type

ii. Dwelling, stacked

1. 1 per dwelling unit.

b. The minimum visitor parking rates identified for Area D on Schedule 1A in Table 102 of the Zoning By-law apply:

i. Stacked dwelling

1. 0.2 per dwelling unit

Required Applications

14. The proposal will require a Site Plan Control – Complex Application

a. Please refer to the City of Ottawa website for more information about the site plan control process. Site Plan Control | City of Ottawa

15. The proposal will require a Lifting of Holding By-Law

a. Please refer to the City of Ottawa website for more information about the Lifting Holding By-Law process Lifting Holding By-law | City of Ottawa

16. The proposal will require a Plan of Condominium if the intention is to proceed with freehold units.

a. Please refer to Plan of Condominium | City of Ottawa for additional information regarding the Plan of Condominium process.

Feel free to contact Amanda Davidson (amanda.davidson@ottawa.ca), Planner I, for follow-up questions.

Urban Design

Comments:

17. Staff require a scoped Urban Design Brief, architectural plans (Site Plan, Building Elevations, etc.), and a Landscape Plan. Please refer to the attached Urban Design Brief Terms of Reference.

18. As part of the landscape details, please ensure that the private amenity area is detailed.

19. If there is a fence surrounding the private amenity area, please ensure that it is a low fence that facilitates visibility from the street.

20. Explore opportunities to enhance circulation to the pathway along the SWM pond.

Novatech Pre-Consultation Response Letter, September 17 2024:

The approved Draft Plan Conditions for the Copperwood Estates Subdivision (Condition #46) requires that a fence be constructed between the SWM pond and the Subject Site. As such, no connection will be provided.

City Response: Acknowledged.

21. Explore additional opportunities for tree and low-scale planting throughout the site.

Feel free to contact Nader Kadri (nader.kadri@ottawa.ca), Planner III, for follow-up questions.

Engineering

List of Studies and Plans Reviewed:

Water Design

a. Submission to include watermain system analysis demonstrating adequate pressure at all sections of the private watermain as per section 4.2.2 of the Water Distribution Guidelines.
b. Demonstrate adequate hydrant coverage for fire protection. Please review Technical Bulletin ISTB-2018-02, Appendix I table 1 – maximum flow to be considered from a given hydrant.
c. Any proposed emergency route (to be satisfactory to Fire Services).

Sanitary Design

a. Sanitary discharge rate as per Copperwood subdivision detailed servicing design. Refer to 1053, 1075, and 1145 March Road Copperwood Estate Detailed Servicing and Stormwater Management Report (Phase 1), Report R-2021-188 prepared by Novatech revised May 19, 2023 and Sanitary Drainage Area Plan, drawing 116132-SAN prepared by Novatech revision 8 dated May 19, 2023
b. A monitoring maintenance hole is required just inside the property line for the proposed development.

c. Please apply the wastewater design flow parameters in Technical Bulletin PIEDTB-2018-01.

Storm Design

d. Stormwater Management Design criteria as per Copperwood subdivision detailed servicing design. Refer to 1053, 1075, and 1145 March Road Copperwood Estate Detailed Servicing and Stormwater Management Report (Phase 1), Report R-2021-188 prepared by Novatech revised May 19, 2023 and Storm Drainage Area Plan, drawing 116132-STM prepared by Novatech revision 9 dated May 19, 2023

23. Geotechnical

a. Sensitive Marine Clay (SMC) is widely found across Ottawa- geotechnical reports should include Atterberg Limits, consolidation testing, sensitivity values, and vane

24. Additional Notes

a. No road moratorium that would impact the application has been identified
b. Any easement identified should be shown on all plans
c. For any proposed exterior light fixtures, please provide certification from a licensed professional engineer confirming lighting has been designed only using fixtures that meet the criteria for full cut-off classification as recognized by the Illuminating Engineering Society of North America and result in minimal light spillage onto adjacent properties (maximum allowable spillage is 0.5 fc). Additionally, include in the submission the location of the fixtures, fixture type (make, model, part number and mounting height.

Feel free to contact Abibatou Dieme (abibatou.dieme@ottawa.ca), Project Manager, for follow-up questions.

Noise

Comments:

22. A noise study is required.

Feel free to contact Mike Giampa (mike.giampa@ottawa.ca), Transportation Project Manager, for follow-up questions.

Transportation

Comments:

23. Buckbean and Spoor road designs (cross sections, pavement width, street parking, etc.) must match the approved subdivision geometric road design drawings.

24. Right-of-way protection.

    a. See Schedule C16 of the Official Plan.

    a. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management.

25. A TIA is not required.

Feel free to contact Mike Giampa (mike.giampa@ottawa.ca), Transportation Project Manager, for follow-up questions.

Environment

Comments:

26. Should the application proceed in advance of registration of the subdivision, an updated Environmental Impact Study will be required and you may require your own permit for Blandings Turtles (endangered species) or the existing permit may need to transfer name.

Novatech Pre-Consultation Response Letter, September 17 2024:

The approved Environmental Impact Study will not be updated as this report has been approved as part of the Copperwood Estates Subdivision as discussed above. A permit for Blanding's Turtle was issued for the Copperwood Estate Subdivision by the Ministry of the Environment, Conservation, and Parks dated March 22, 2021. Currently, the Copperwood Estates Subdivision is currently under construction with the Shirley's Brook Tributary realigned.

City Response: Work on this site will need to follow the recommendations of the Combined Environmental Impact Statement & Tree Conservation report and those of the subsequent addendums. The City recommends that a Minor EIS be prepared to summarize the work completed under the MECP permit, a summary of the monitoring results and what considerations need to be addressed as part of the site plan approval, for example the location of the proposed snow storage adjacent to the corridor.

Development within 30 m of a watercourse and endangered species habitat is a trigger for an EIS.

27. After registration, please provide an Integrated Environmental Report indicating that the recommendations of the subdivision and Environmental Management Plan are implemented.

Novatech Pre-Consultation Response Letter, September 17 2024:

An Integrated Environmental Report will not be submitted after registration. The Planning Rationale and Integrated Environmental Review prepared by Novatech dated July 24, 2018 was approved as part of the Copperwood Estates Subdivision. No IER is required as a Planning Rationale is not required.

City Response: Noted, draft conditions reviewed and it isn't required.

28. Please discuss how the site will integrate with the pathway. Turtle fencing is a requirement of the subdivision that was proposed to address the requirements of the ESA/Blanding's turtle. It needs to be installed before this site plan is built.

Novatech Pre-Consultation Response Letter, September 17 2024:

No connections to pathway will be provided as discussed during the meeting.

City Response: Acknowledge that there will be no direct connections to the pathway. The pathway is a requirement however of the subdivision and the site will need to address this and on how they transition their site to the public pathway.

29. Considering that the tributary to the south is protected turtle habitat, staff have concerns with the snow storage in the southeast corner. Runoff from that snow as it melts can carry a lot of salt and other contaminants into the water. The snow storage location should be moved, or an engineered solution should be provided to ensure runoff does not enter the tributary.

Novatech Pre-Consultation Response Letter, September 17 2024:

An engineered solution will be provided to ensure runoff does not enter the tributary.

City Response: Noted, see comment regarding EIS.

30. Plantings on the southern grassy strip would assist with protecting the naturalized corridor. More space could be made for tree plantings if the pavers were moved a little north, closer to the building. The southernmost building (block 3) itself could also be moved slightly north, there seems to be some room left with regard to the yard setbacks on the north side of the building.

Feel free to contact Matthew Hayley (matthew.hayley@ottawa.ca), Environmental Planner, for follow-up questions.

Forestry

Comments:

31. Confirm whether any trees remain on the sites proposed for development. If yes, a TCR will be required with the Site Plan application, in accordance with Schedule E of the Tree Protection By-law.

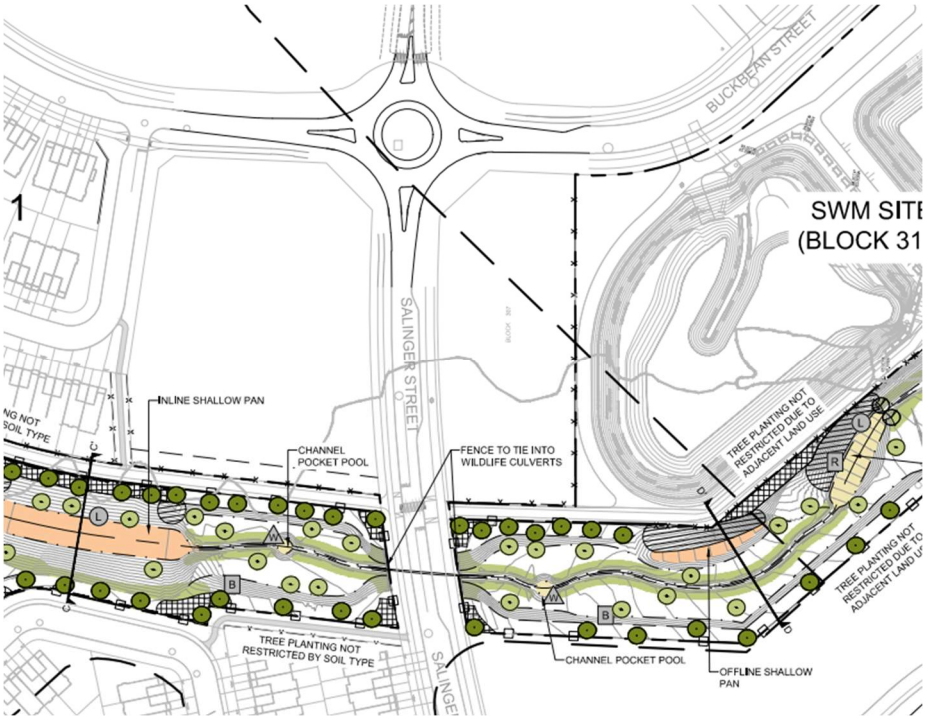
Novatech Pre-Consultation Response Letter, September 17 2024:

There are no existing trees on the Subject Site. A Tree Cutting Permit (City File No.: D06-01- 18-0133) was issued by the City of Ottawa for the Copperwood Estates Subdivision in March 2021. As such, a Tree Conservation Report is not required and will not be submitted for the Subject Site.

City Response: Response document confirmed that all trees have been removed as part of the subdivision plan and permit. No further comments on the TCR.

The following comment (comment #32) was not adequately addressed in the response letter. It must be confirmed that the design of this site, particularly the parking and grading along the property lines will not impact newly planted trees or proposed tree planting locations on the adjacent property.

32. The 2 adjacent properties (Shirley's brook tributary #2 and SWM site) have Landscape Plans in place. The design of the PUD and proposed parking, services, etc. must account for the retention, protection and growing space for trees planted and/or proposed on these properties.

a. 

33. Snip from TCR Addendum July 5, 2023. McKinley.

    a. A permit is required prior to removal of any protected trees on site. The tree permit will be released upon site plan approval. Monetary compensation for City trees must be paid before the permit is issued. Please contact the planner associated with the file or the Planning Forester, Nancy Young (Nancy.young@ottawa.ca) for information on obtaining the tree permit.

    b. To ensure that no harm is caused to breeding birds, tree removal and vegetation clearing should be avoided during the migratory bird season (April 15 – August 15) as specified by The City of Ottawa's Environmental Impact Study Guidelines.

City Response: All landscape plan comments from the pre-consultation are still outstanding.

Landscape Plan Comments

34. A Landscape Plan is required with this application and must address all requirements within the Landscape Plan Terms of Reference (https://documents.ottawa.ca/sites/documents/files/landscape_tor_en.pdf), including the projection of canopy cover toward the target of 40%, and confirmation of adequate soil volumes to support any proposed trees.

35. Please ensure that any tree planting conforms with the recommendations in the geotechnical report provided with the subdivision application. If there are specific

recommendations relating to this site, they must be reflected in the Landscape Plan, including confirmation that the proposed layout will provide sufficient setbacks for tree planting.

36. Please provide street trees within the 2 municipal road allowances. This must be provided by either the subdivision development or through the site plan application.

37. The Landscape Plan must show the setback distances between proposed and existing trees to buildings and underground structures to ensure that both the above and below-ground space proposed is sufficient for tree planting in the Right of Way and other landscaped areas.

38. It is a Best Management Practice to plant 1 tree for every 5 parking spaces to reduce the heat island effect created by paving and also to work toward the 40% canopy cover target. Ideally trees could be planted directly in the vicinity of parking areas to provide shade; please consider this in the site layout.

39. The Official Plan section 4.8.2, sub 3 provides the following direction related to tree planting related to site plans:

    a. Preserve and provide space for mature, healthy trees on private and public property, including the provision of adequate volumes of high-quality soil as recommended by a Landscape Architect;

    b. On urban properties subject to site plan control or community planning permits, development shall create tree planting areas within the site and in the adjacent boulevard, as applicable, that meet the soil volume requirements in any applicable City standards or best management practices or in accordance with the recommendation of a Landscape Architect.

Feel free to contact Nancy Young, Forester, nancy.young@ottawa.ca, for follow-up questions.

Parkland

40. the Parkland Dedication is requirements for the development will have been accounted for through the registration of subdivision application: D07-16-18-0023. The conditions of subdivision registration will require updating to account for the multi-residential units. The owners planning team is asked to contact the park planner to confirm the approach to parkland tracking in light of the landowners cost sharing agreement.

41. How many site plan applications are anticipated for the multi-unit residential blocks within the draft plan of subdivision?

Novatech Pre-Consultation Response Letter, September 17 2024:

Separate Site Plan Control applications will be filed for each of the multi-unit residential blocks with the Copperwood Estates Subdivision.

City Response: Acknowledged.

42. What is the unit count and commercial square footage expected in the multi-unit blocks within the plan of subdivision. Are we still anticipated 216 units as was indicated in the subdivision application?

Novatech Pre-Consultation Response Letter, September 17 2024:

To be confirmed at the time of Site Plan Control application. No commercial will be developed.

City Response: Acknowledged.

43. Should any of the site plan developments cumulatively result in a parkland dedication requirement exceeding that which is accounted for through the subdivision agreement, there will be a requirement for Cash-in-lieu of parkland.

Feel free to contact Anissa McAlpine (anissa.mcalpine@ottawa.ca), Parks Planner, for follow-up questions.

We look forward to further discussing your project with you.

Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,

Amanda Davidson
Planner I, Development Review West

Encl. Study and Plan Identification List
List of Technical Agencies

c.c. Stream Shen, Planner III, Development Review West

Abi Dieme, Infrastructure Approvals Project Manager
Rubina Rasool, Infrastructure Approvals Project Manager
Mike Giampa, Transportation Project Manager
Nader Kadri, Planner III, Urban Design
Nancy Young, Forester
Anissa McAlpine, Planner II, Parks and Facilities Planning
Matthew Hayley, Environmental Planner

Appendix B
Water Servicing

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Boundary Condition Request

Novatech Project #:	122144
Project Name:	Copperwood Flats - Block 125
Date:	2/18/2025
Input By:	Curtis Ferguson, E.I.T
Reviewed By:	Anthony Mestwarp, P.Eng.
Drawing Reference:	

Legend: Input by User | No Input Required | Calculated Cells →

Reference: Ottawa Design Guidelines - Water Distribution (2010 and TBs)
MOE Design Guidelines for Drinking-Water Systems (2008)
Fire Underwriter's Survey Guideline (2020)
Ontario Building Code, Part 3 (2012)

Small System = YES

	# of Dwellings	Area (ha.)	Pop. Equiv.	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Residential Input						
Stacked Towns	36		75.60	0.25	2.33	3.50
Totals	**36**		**75.60**	**0.25**	**2.33**	**3.50**

Summary

i. Type of Development and Units:	Low-Rise Stacked Flats - 3 Blocks, 12 Units per Block	
ii. Site Address:	1053, 1075, and 1145 March Road	
iv. Average Day Flow Demand:	0.25	L/s
v. Peak Hour Flow Demand:	3.50	L/s
vi. Maximum Day Flow Demand:	2.33	L/s
vii. Required Fire Flow #1:	13,000	L/min
viii. Required Fire Flow #2:	13,000	L/min
ix. Required Fire Flow #3:	11,000	L/min

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Design Parameters

Residential					
Unit Type	**Singles**	**Semis/ Towns**	**Apts (2-BR) / Stacked Towns**	**Apts (1-BR)**	**Apts (Avg)**
Population Equiv.	3.4	2.7	2.1	1.4	1.8
Dailly Demand	L/per person/day				
Average Demand	280				
Basic Demand	200				

Residential Peaking Factors		**Max Day (x Avg Day)**	**Peak Hour (x Avg Day)**
	Pop.		
Small System (If Applicable)	0	9.50	14.30
	30	9.50	14.30
	150	4.90	7.40
Modified	300	3.60	*5.50*
	450	3.00	*5.50*
	500	2.90	*5.50*
Large System (Default)	> 500	2.50	5.50

Institutional / Commercial / Industrial				
Industrial		**Commercial**	**Institutional**	**Other Use**
Light	**Heavy**			
L/gross ha/day				L/m²/day
35,000	55,000	28,000	28,000	5
10,000	17,000	17,000	17,000	3

ICI Peaking Factors	**Max Day (x Avg Day)**	**Peak Hour (x Avg Day)**
	1.50	2.70

FUS - Fire Flow Calculations

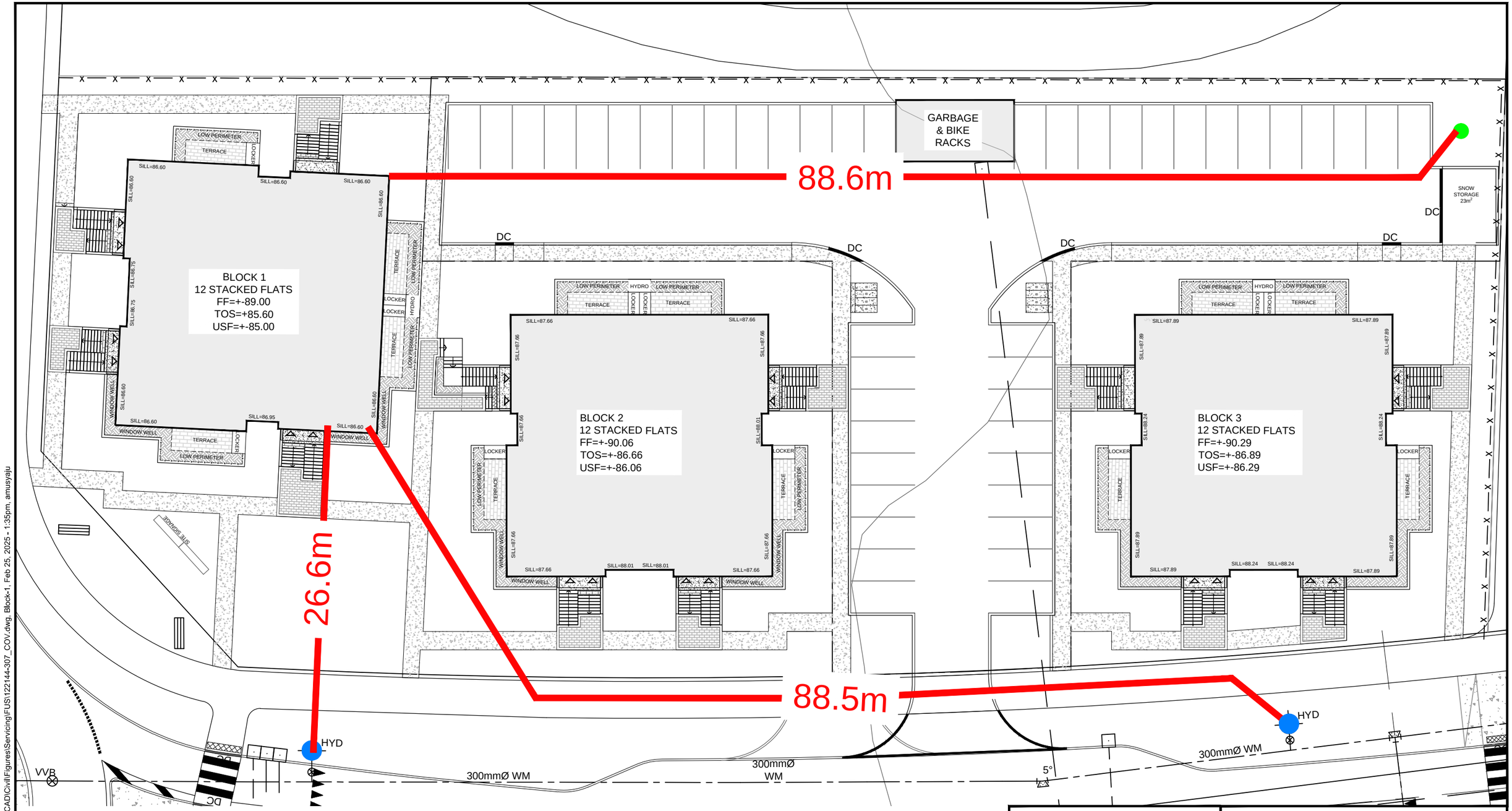
NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122144
Project Name: Copperwood Flats - Block 125
Date: 9/12/2024
Input By: Anjush Musyaju, E.I.T
Reviewed By: Anthony Mestwarp, P.Eng
Drawing Reference: 122144-SEP1

Legend: Input by User
No Input Required
Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: Block 1 - 12 Unit Stacked Town
Type V - Wood frame

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame	Yes	1.5	1.5	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	447			
		Number of Floors/Storeys	3			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m^2)			**1,341**	
	F	**Base fire flow without reductions**				**12,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**10,200**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	No	-30%		**0**
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Sub-Total	**0%**	
		Area of Sprinklered Coverage (m^2)	0	0%		
				Cumulative Total	**0%**	
5	**Exposure Surcharge**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	20.1 - 30 m		10%	**2,550**
		East Side	>30m		0%	
		South Side	10.1 - 20 m		15%	
		West Side	>30m		0%	
				Cumulative Total	**25%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**13,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**217**
				or	USGPM	3,435



LEGEND

- PROPERTY LINE
- PROPOSED SIAMESE CONNECTION
- EXISTING CLASS AA HYDRANT
- PROPOSED HYDRANT
- DISTANCE FROM HYDRANT TO SIAMESE CONNECTION/ BUILDING ENTRANCE
- PROPOSED ENTRANCE

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Engineers, Planners & Landscape Architects
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Website www.novatech-eng.com

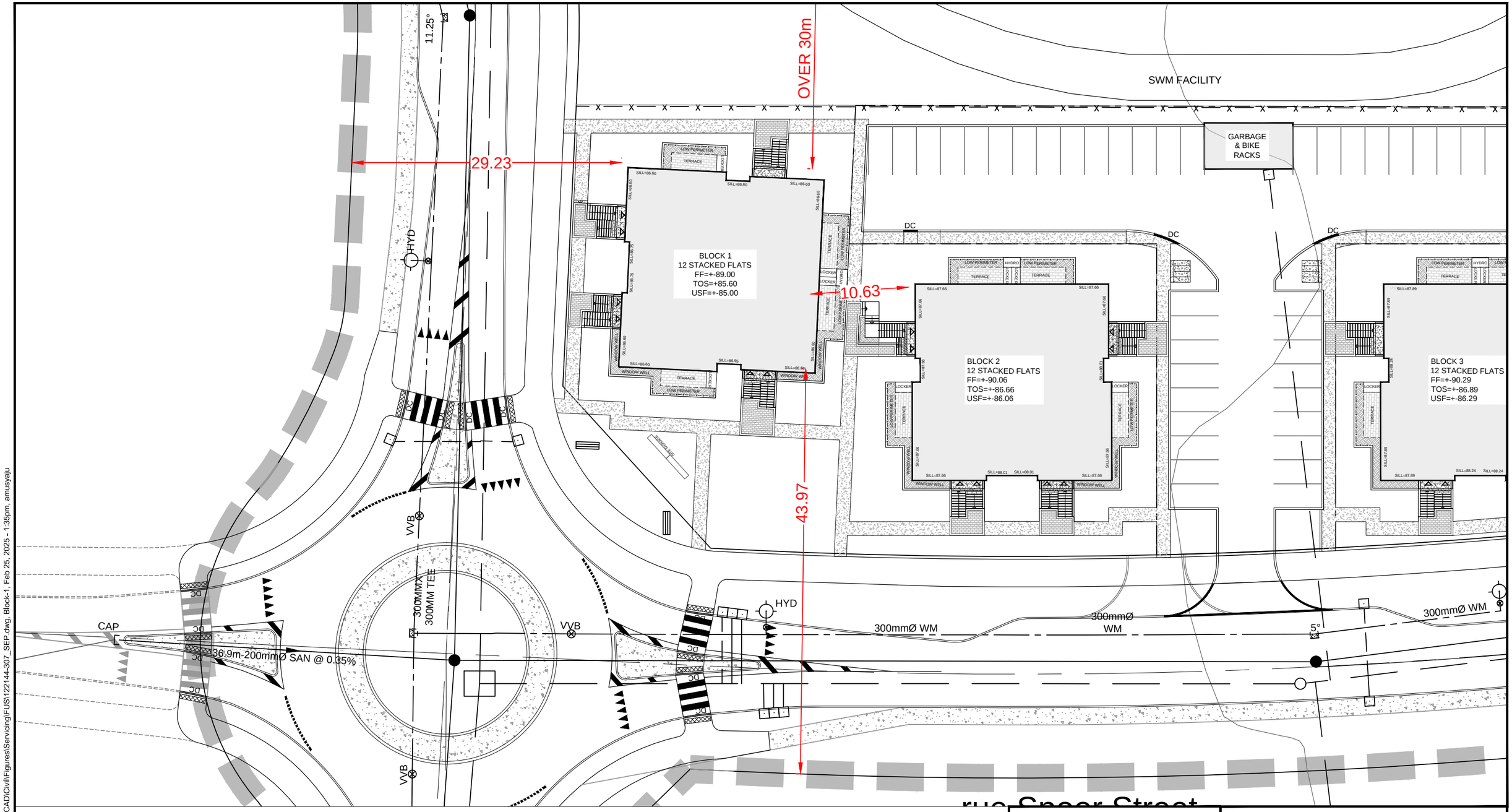
COPPERWOOD FLATS
LOW RISE APARTMENTS-BLOCK 125

COVERAGE PLAN (BLOCK 1)

SCALE	DATE	JOB	FIGURE
1 : 300 (0 3 6 9 12)	SEPTEMBER 2024	122144	COV1

SHT11X17.DWG - 279mmX432mm

\\novatech\2018\nova2\2022\122144\BLOCK 307\CAD\Civil\Figures\Servicing\FUS\122144-307_COV.dwg, Block-1, Feb 25, 2025 - 1:35pm, amusyaju



LEGEND

PROPERTY LINE

DISTANCE FROM HYDRANT TO SIAMESE CONNECTION/ BUILDING ENTRANCE

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COPPERWOOD FLATS
LOW RISE APARTMENTS-BLOCK 125

FUS SEPARATION (BLOCK 1)

SCALE 1 : 400 (0, 4, 8, 12, 16)

DATE SEPTEMBER 2024 | JOB 122144 | FIGURE SEP1

SHT11X17.DWG - 279mmX432mm

FUS - Fire Flow Calculations

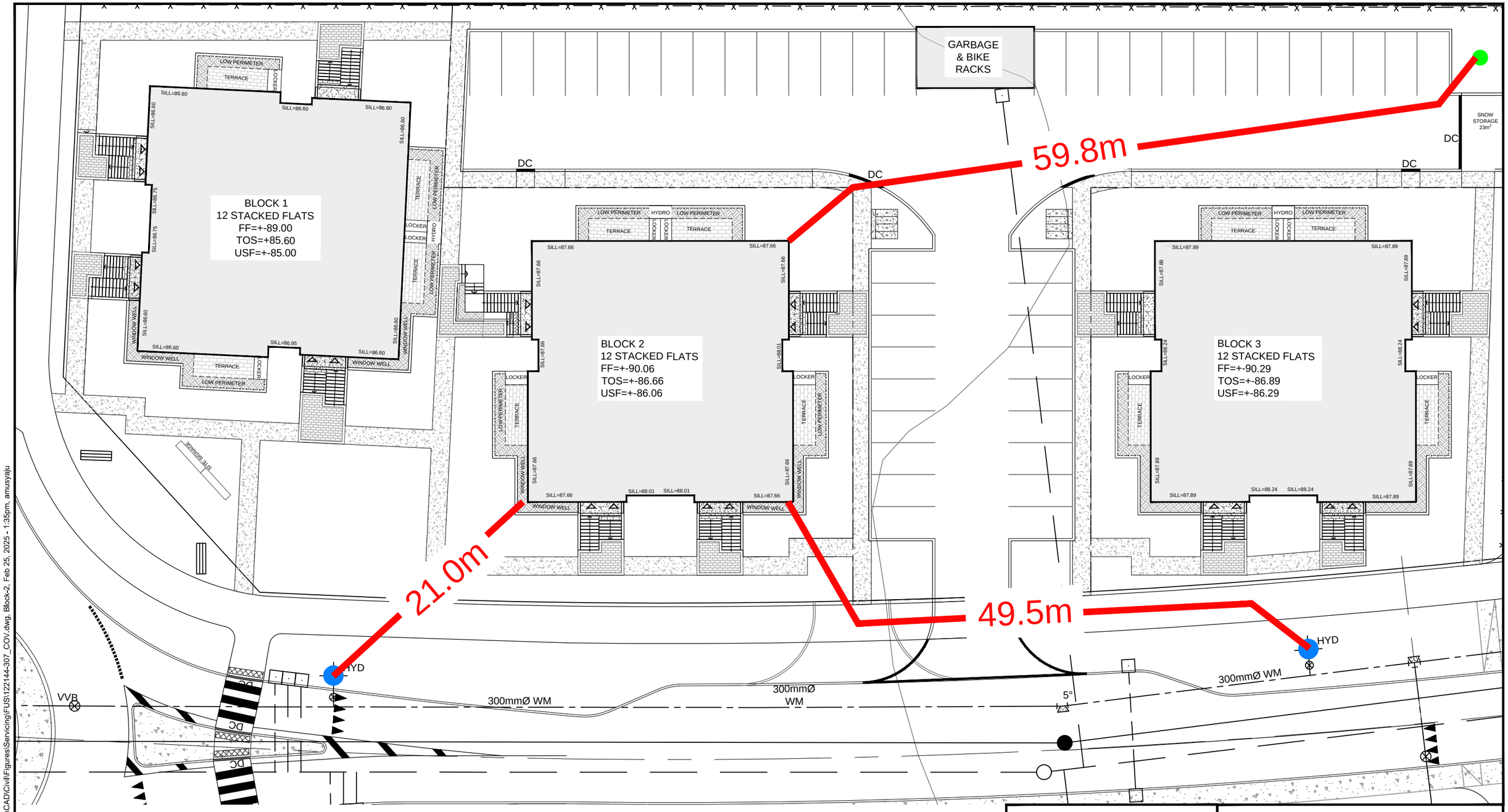
NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122144
Project Name: Copperwood Flats - Block 125
Date: 9/12/2024
Input By: Anjush Musyaju, E.I.T
Reviewed By: Anthony Mestwarp, P.Eng
Drawing Reference: 122144-SEP2

Legend: Input by User
No Input Required
Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: Block 2 - 12 Unit Stacked Town
Type V - Wood frame

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame	Yes	1.5	1.5	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	447			
		Number of Floors/Storeys	3			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m^2)			**1,341**	
	F	**Base fire flow without reductions**				**12,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**10,200**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	No	-30%		**0**
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Sub-Total	**0%**	
		Area of Sprinklered Coverage (m^2)	0	0%		
				Cumulative Total	**0%**	
5	**Exposure Surcharge**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	10.1 - 20 m		15%	**2,550**
		East Side	>30m		0%	
		South Side	20.1 - 30 m		10%	
		West Side	>30m		0%	
				Cumulative Total	**25%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**13,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**217**
				or	USGPM	3,435



LEGEND

- PROPERTY LINE
- PROPOSED SIAMESE CONNECTION
- EXISTING CLASS AA HYDRANT
- PROPOSED HYDRANT
- DISTANCE FROM HYDRANT TO SIAMESE CONNECTION/ BUILDING ENTRANCE
- PROPOSED ENTRANCE

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COPPERWOOD FLATS
LOW RISE APARTMENTS-BLOCK 125

COVERAGE PLAN (BLOCK 2)

SCALE 1 : 300 (0 3 6 9 12)

DATE SEPTEMBER 2024 | JOB 122144 | FIGURE COV2

SHT11X17.DWG - 279mmX432mm

\\novatech2018\nova2\2022\122144\BLOCK 307\CAD\Civil\Figures\Servicing\FUS\122144-307_COV.dwg, Block-2, Feb 25, 2025 - 1:35pm, amusyaju

SWM FACILITY

OVER 30m

GARBAGE & BIKE RACKS

SNOW STORAGE 23m²

BLOCK 1
12 STACKED FLATS
FF=+-89.00
TOS=+-85.60
USF=+-85.00

BLOCK 2
12 STACKED FLATS
FF=+-90.06
TOS=+-86.66
USF=+-86.06

BLOCK 3
12 STACKED FLATS
FF=+-90.29
TOS=+-86.89
USF=+-86.29

10.63

29.55

32.00

11.25°

5°

0.35%

HYD

VVB

DC

300mmØ WM

300mmØ WM

300MM TEE

300MM

LEGEND

PROPERTY LINE

DISTANCE FROM HYDRANT TO SIAMESE CONNECTION/ BUILDING ENTRANCE

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COPPERWOOD FLATS
LOW RISE APARTMENTS-BLOCK 125

FUS SEPARATION (BLOCK 2)

SCALE 1 : 400 (0, 4, 8, 12, 16)

DATE SEPTEMBER 2024 | JOB 122144 | FIGURE SEP2

SHT11X17.DWG - 279mmX432mm

FUS - Fire Flow Calculations

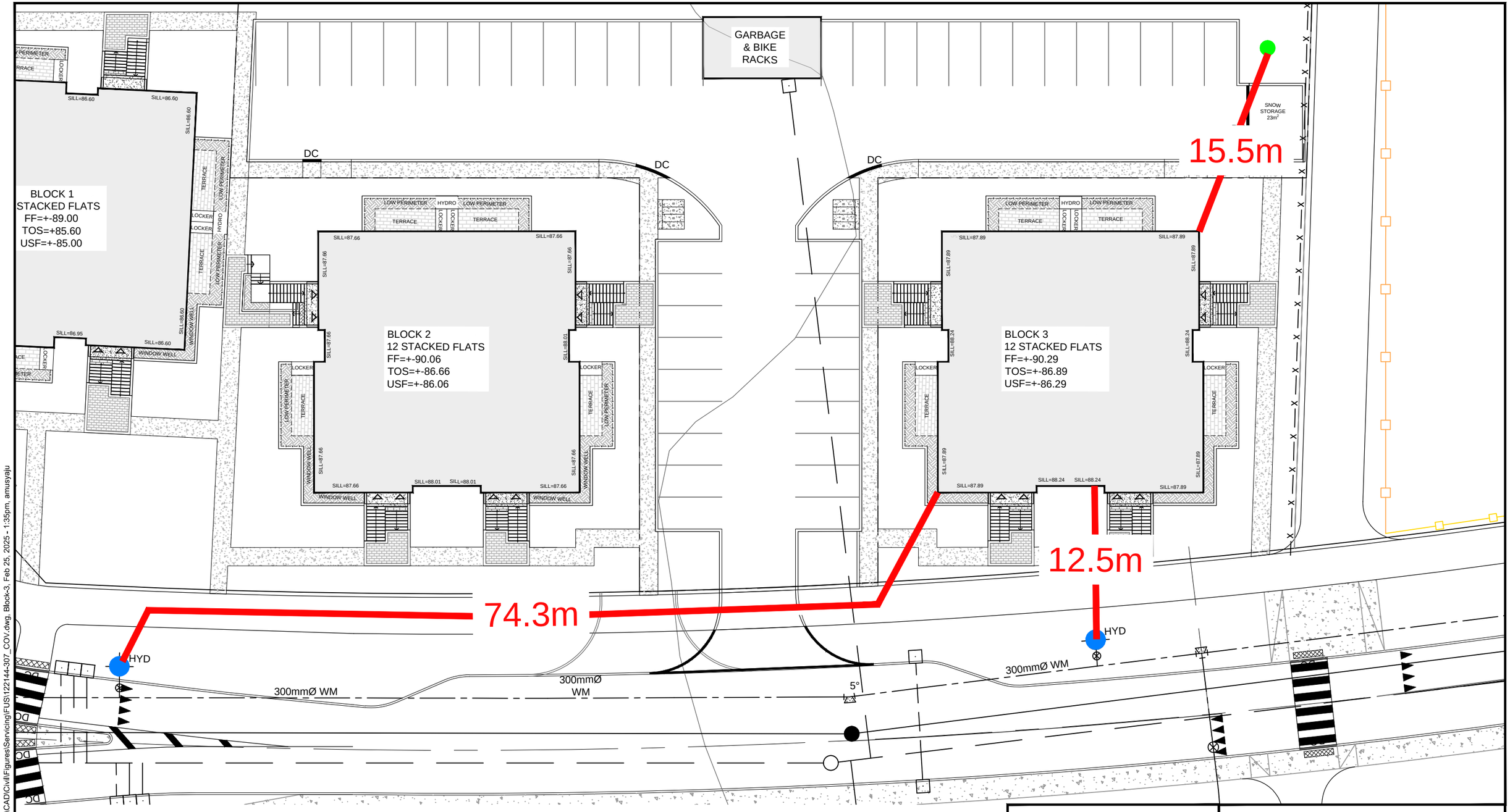
NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122144
Project Name: Copperwood Flats - Block 125
Date: 9/12/2024
Input By: Anjush Musyaju, E.I.T
Reviewed By: Anthony Mestwarp, P.Eng
Drawing Reference: 122144-SEP3

Legend: Input by User
No Input Required
Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: Block 3 - 12 Unit Stacked Towns
Type V - Wood frame

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame	Yes	1.5	1.5	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	447			
		Number of Floors/Storeys	3			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m^2)			**1,341**	
	F	**Base fire flow without reductions**				**12,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**10,200**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	No	-30%		**0**
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Sub-Total	**0%**	
		Area of Sprinklered Coverage (m^2)	0	0%		
				Cumulative Total	**0%**	
5	**Exposure Surcharge**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	20.1 - 30 m		10%	**1,020**
		East Side	>30m		0%	
		South Side	>30m		0%	
		West Side	>30m		0%	
				Cumulative Total	**10%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**11,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**183**
				or	USGPM	2,906



LEGEND

- PROPERTY LINE
- PROPOSED SIAMESE CONNECTION
- EXISTING CLASS AA HYDRANT
- PROPOSED HYDRANT
- DISTANCE FROM HYDRANT TO SIAMESE CONNECTION/ BUILDING ENTRANCE
- PROPOSED ENTRANCE

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COPPERWOOD FLATS
LOW RISE APARTMENTS-BLOCK 125

COVERAGE PLAN (BLOCK 3)

SCALE 1 : 300 (0 3 6 9 12)

DATE SEPTEMBER 2024 | JOB 122144 | FIGURE COV3

SHT11X17.DWG - 279mmX432mm

\\novatech\2018\nova2\2022\122144\BLOCK 307\CAD\Civil\Figures\Servicing\FUS\122144-307_COV.dwg, Block-3, Feb 25, 2025 - 1:35pm, amusyaju

SWM FACILITY

GARBAGE & BIKE RACKS

SNOW STORAGE 23m²

OVER 30m

29.55

30.01

BLOCK 1
12 STACKED FLATS
FF=+-89.00
TOS=+85.60
USF=+-85.00

BLOCK 2
12 STACKED FLATS
FF=+-90.06
TOS=+-86.66
USF=+-86.06

BLOCK 3
12 STACKED FLATS
FF=+-90.29
TOS=+-86.89
USF=+-86.29

DC

HYD

300mmØ WM

5°

rue Spear Street

LEGEND

PROPERTY LINE

DISTANCE FROM HYDRANT TO SIAMESE CONNECTION/ BUILDING ENTRANCE

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COPPERWOOD FLATS
LOW RISE APARTMENTS-BLOCK 125

FUS SEPARATION (BLOCK 3)

SCALE 1 : 400 (0, 4, 8, 12, 16)

DATE SEPTEMBER 2024 | JOB 122144 | FIGURE SEP3

SHT11X17.DWG - 279mmX432mm

\\novatech2018\nova2\2022\122144\BLOCK 307\CAD\Civil\Figures\Servicing\FUS\122144-307_SEP.dwg, Block-3, Feb 25, 2025 - 1:35pm, amusyalju

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122144
Project Name: Copperwood Flats - Block 125
Date: 3/19/2025
Input By: Curtis Ferguson, E.I.T.
Reviewed By: Anthony Mestwarp P.Eng
Drawing Reference: 122144 - EPA Net

Legend: Input by User | No Input Required | Calculated Cells →

Reference: Ottawa Design Guidelines - Water Distribution (2010 and TBs)
MOE Design Guidelines for Drinking-Water Systems (2008)
Fire Underwriter's Survey Guideline (2020)
Ontario Building Code, Part 3 (2012)

Small System = YES

Location	Total Water Demand															
Node	Residential Input & Average Demand							Maximum Day & Peak Hour Demand						Design Fire Demand		
								Maximum Day Demand			Peak Hour Demand			Required Fire Flow (RFF)		
	Singles	Semis / Towns	Apts (2-BR) / Stacked Towns	Apts (1-BR)	Apts (Avg)	Pop. Equiv.	Res. Average Day Flow Demand (L/s)	Res. Peaking Factor	ICI Peaking Factor	Max Day Flow Demand (L/s)	Res. Peaking Factor	ICI Peaking Factor	Peak Hour Flow Demand (L/s)	FUS (L/min)	Max Day + RFF (L/s)	
BLK125A			18			37.80	0.12	9.50	1.50	1.16	14.30	2.70	1.75		1.16	
BLK125B			18			37.80	0.12	9.50	1.50	1.16	14.30	2.70	1.75	13,000	217.83	
N5c						0.00	0.00	9.50	1.50	0.00	14.30	2.70	0.00		0.00	
N5b						0.00	0.00	9.50	1.50	0.00	14.30	2.70	0.00		0.00	
Copperwood Flats Total	**0**	**0**	**36**	**0**	**0**	**75.60**	**0.25**	**9.50**	**1.50**	**2.33**	**14.30**	**2.70**	**3.50**			

Demand Parameters

Residential					
Unit Type Population Equiv.	**Singles**	**Semis/ Towns**	**Apts (2-BR)**	**Apts (1-BR)**	**Apts (Avg)**
	3.4	2.7	2.1	1.4	1.8
Dailly Demand	L/per person/day				
Average Demand	280				
Basic Demand	200				

Residential Peaking Factors		Max Day (x Avg Day)	Peak Hour (x Avg Day)
	Pop.		
Small System (If Applicable)	0	9.50	14.30
	30	9.50	14.30
	150	4.90	7.40
Modified	300	3.60	*5.50*
	450	3.00	*5.50*
	500	2.90	*5.50*
Large System (Default)	> 500	2.50	5.50

Quick Fire Flow Reference Guide			
FUS (L/min)	**Comments**	**OBC (L/min)**	**Comments**
> 2,000	**Min FUS**	**< 9,000**	**Unsprinklered Non- Combustible**
	Low Density - Singles/Towns		
10,000	Complies w/ TB2014-01 Cap. (10m rear spacing, 6 units max, <600 m²)		
13,000	Non-complying w/TB2014-01. Calculate.		
15,000	**Medium Density** Back-to-back Towns**.**		
	High Density		
20,000	Wood Frame 4-Storey		
5,000	Fire-Resisitve Podium/Multi-Storey		
30,000	**High Contiguous / Hazard Areas**		
< 45,000	**Max FUS**		

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

EPA Net Pipe Length, Diameter and Coefficient

Novatech Project #: 122144
Project Name: Copperwood Flats - Block 125
Date: 3/19/2025
Input By: Curtis Ferguson, E.I.T.
Reviewed By: Anthony Mestwarp P.Eng
Drawing Reference: 122144-EPA Net

Legend: Input by User | No Input Required
Acceptable (40psi - 80psi)
Acceptable w/ PRV (81psi - 100psi)
Unacceptable (< 40psi or > 100psi)

Note: Hydraulic modelling completed using EPANET 2.0.

Pipe	Length (m)	Diameter (mm)	Coefficient
P10A	51.98	152	100
P10C	27.77	152	100
P125A	54.16	152	100
P125B	42.66	152	100
P125C	107.40	152	100

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Maximum Pressure During Average Day (AVDY) Conditions

Novatech Project #: 122144
Project Name: Copperwood Flats - Block 125
Date: 3/19/2025
Input By: Curtis Ferguson, E.I.T.
Reviewed By: Anthony Mestwarp P.Eng
Drawing Reference: 122144-EPA Net

Legend: Input by User | No Input Required
Acceptable (40psi - 80psi)
Acceptable w/ PRV (81psi - 100psi)
Unacceptable (< 40psi or > 100psi)

Note: Hydraulic modelling completed using EPANET 2.0.

Node	Elevation (m)	Demand (L/s)	Total Head (m)	Pressure (m)	Pressure (psi)
BLK125A	86.39	0.12	130.39	44.00	63
BLK125B	87.15	0.12	130.39	43.24	61
N5c	87.60	0.00	130.39	42.79	61
N5b	86.80	0.00	130.39	43.59	62

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Minimum Pressure During Peak Hour (PKHR) Conditions

Novatech Project #: 122144
Project Name: Copperwood Flats - Block 125
Date: 3/19/2025
Input By: Curtis Ferguson, E.I.T.
Reviewed By: Anthony Mestwarp P.Eng
Drawing Reference: 122144 - EPA Net

Legend: Input by User | No Input Required
Acceptable (=> 40psi)
Unacceptable (< 40psi)

Note: Hydraulic modelling completed using EPANET 2.0.

Node	Elevation (m)	Demand (L/s)	Total Head (m)	Pressure (m)	Pressure (psi)
BLK125A	86.39	1.75	122.10	35.71	51
BLK125B	87.15	1.75	122.10	34.95	50
N5c	87.60	0.00	122.11	34.51	49
N5b	86.80	0.00	122.11	35.31	50

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Minimum Pressure During Max Day Plus Fire Flow (MXDY+FF) Condition

Novatech Project #: 122144
Project Name: Copperwood Flats - Block 125
Date: 3/19/2025
Input By: Curtis Ferguson, E.I.T.
Reviewed By: Anthony Mestwarp P.Eng
Drawing Reference: 122144 - EPA Net

Legend: Input by User | No Input Required
Acceptable (=> 20psi)
Unacceptable (< 20psi)
Note: Hydraulic modelling completed using EPANET 2.0.

Node	Elevation (m)	Demand (L/s)	Total Head (m)	Pressure (m)	Pressure (psi)
BLK125A	86.39	1.16	114.16	27.77	39
BLK125B	87.15	2.33	114.10	26.95	38
N5c	87.60	95.00	114.07	26.47	38
N5b	86.80	27.00	114.38	27.58	39
N5a	87.35	95.62	114.07	26.72	38

As per City of Ottawa ITSB-2018-02, Fire Flows are spread among mutiple Hydrants per Page 4.12

BLK125A

P125B

BLK125B

GARBAGE & HYDRO EQUIPMENT ROOM

SNOW STORAGE 23m²

BLOCK 1
12 STACKED FLATS
FF=+-89.00
TOS=+85.60
USF=+-85.00

P125C

BLOCK 2
12 STACKED FLATS
FF=+-90.06
TOS=+-86.66
USF=+-86.06

P125A

BLOCK 3
12 STACKED FLATS
FF=+-90.29
TOS=+-86.89
USF=+-86.29

REFER TO 116132- EPA MODEL FOR SURROUNDING COPPERWOOD ESTATES SUBDIVISION DETAILS

REFER TO 116132- EPA MODEL FOR SURROUNDING COPPERWOOD ESTATES SUBDIVISION DETAILS

16H
ASPHALT WALKWAY

PHASE 1A

KNE25

N5b
300mmØ WM

N5c

N5a

P10B

P10A

P10C

STMMH 1300
T/G=87.59
INV.N=82.27
INV.S=82.32

rue Spoor Street

LEGEND

P10A — WATERMAIN PIPE

N5b — WATERMAIN NODE

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COPPERWOOD FLATS - BLOCK 125

WATERMAIN LAYOUT

SCALE 1 : 500 (0, 5m, 10m, 20m)

DATE FEB 2025 | JOB 122144 | FIGURE EPA

SHT11X17.DWG - 279mmX432mm

M:\2022\122144\BLOCK 307\CAD\Civil\Figures\Watermain\122144-EPA Net Figure.dwg, EPA NET, Mar 19, 2025 - 3:10pm, cferguson

SEE MINTO CONNECTION PLAN

CONNECTION TO WATERMAIN

CONNECTION TO WATERMAIN

MARCH

MAXWELL ROAD

MARCH ROAD

MURPHY CRESCENT

EXISTING ST.ISIDORE ROMAN CATHOLIC PARISH

EXISTING ST.ISIDORE SCHOOL

EXISTING CEMETERY

EXISTING RESIDENTIAL 1055 MARCH RD

EXISTING RESIDENTIAL 1015 MARCH RD

FUTURE CLARIDGE

FUTURE SCHOOL PROPERTY

BUCKBEAN STREET

BOSCH STREET

SALINGER STREET

DANDELION STREET

WHITLOW GRASS STREET

HAGUE STREET

ROTTERDAM STREET

SPOOR STREET

C.E.P.E.O.

MARCHBROOK

Park and Ride

Fire Hall

2.13 Ha

300mmØ WM

200mmØ WM

400mmØ WM

MAX 257L/s

MAX 233L/s

P1 P2A P2B P4 P5 P6 P7 P8 P9 P10A P10B P11 P12A P12B P13 P14A P14B P15A P15B P16A P16B P17 P18 P19 P20A P20B P21 P22 P23 P24 P25 P26A P26B P27A P27B P28A P28B P29 P30 P31A P31B P32 P33A P33B P34 P35A P46 P47 P48 P49 P50B P51A P51B P52 P53A P53B P54 P74 P75 P76 P77B P78 P79 P80 P81 P83 P84 P85 P86 P87 P88 R1

KNE 01 KNE 02 KNE 03 KNE 04 KNE 05 KNE 06 KNE 07 KNE 08 KNE 09 KNE 10 KNE 11 KNE 12 KNE 13 KNE 14 KNE 15 KNE 16 KNE 17 KNE 18 KNE 19 KNE 20 KNE 21 KNE 22

1 2 3a 3b 4 5a 5b 6 7a 7b 8a 8b 9a 9b 10 11 12 13a 13b 14 15 16 17a 17b 18a 18b 19a 19b 20a 20b 21a 21b 22a 29a 29b 30 31 32 33a 33b 34a 34b 48 49 50 51 54

WATERMAIN ALONG MARCH ROAD SIZED AS PER MASTER SERVICING STUDY - KANATA NORTH. TO BE CONSTRUCTED PRIOR TO COPPERWOOD ESTATE CONNECTIONS.

ALL ON-SITE NODES REPRESENT LOCAL DEMANDS (CLARIDGE /UNIFORM) AS PER THE CITY OF OTTAWA DESIGN GUIDELINES - WATER DISTRIBUTION SYSTEMS

CONNECTION TO EXISTING 200mm WATERMAIN

SEE MINTO CONNECTION PLAN SCALE 1:20000

LEGEND

- PROPERTY LINE
- P5 — PROPOSED BACKBONE WATERMAIN AS PER KANATA NORTH MASTER SERVICING STUDY - COMPLETED BY NOVATECH, JUNE 28, 2016 (WATER ANALYSIS BY STANTEC)
- P5 — PROPOSED LOCAL WATERMAIN AND ID NUMBER
- 1 — PROPOSED NODE AND ID NUMBER
- R1 — EXISTING RESERVOIR AND ID NUMBER
- MAX 160L/s 1 — MAXIMUM ACHIEVABLE FIREFLOW

NOTES:
1) UNLESS OTHERWISE NOTED, A FIREFLOW OF 167L/s HAS BEEN ANALYSED, AS PER STANTEC'S POTABLE WATER ASSESSMENT, DATED MARCH 2016.
2) HIGH DENSITY FIREFLOWS TO BE CONFIRMED AND ANALYZED AT DETAILED DESIGN / SITE PLAN APPLICATION STAGE.

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CITY OF OTTAWA

COPPERWOOD ESTATE
1053, 1075 and 1145 MARCH ROAD

WATERMAIN NETWORK NODE LOCATIONS - COPPERWOOD ESTATE DESIGN DEMAND WITH KNUEA ALLOWANCES

SCALE 1 : 5000 (0 50 100 150 200)

DATE NOV 2022 | JOB 116132 | FIGURE FIG-WM1

SEE MINTO CONNECTION PLAN

REPRESENTS NODE DEMAND FROM N_KNE02, N_KNE11-13, N_KNE21 AS PER STANTEC'S POTABLE WATER ASSESSMENT

PROVISIONAL CONNECTION, ONLY IF FUTURE WATERMAIN PROCEEDS. CONNECTION NOT ACCOUNTED FOR IN ANALYSIS (CONSERVATIVE)

REPRESENTS NODE DEMAND FROM N_KNE01 AS PER STANTEC'S POTABLE WATER ASSESSMENT

WATERMAIN ALONG MARCH ROAD SIZED AS PER MASTER SERVICING STUDY - KANATA NORTH

CONNECTION TO WATERMAIN

CONNECTION TO WATERMAIN

REPRESENTS NODE DEMAND FROM N_KNE04, N_KNE05-06, N_KNE20 AS PER STANTEC'S POTABLE WATER ASSESSMENT

MARCH

MAXWELL ROAD

MURPHY CRESCENT

EXISTING ST.ISIDORE ROMAN CATHOLIC PARISH

EXISTING CEMETERY

EXISTING ST.ISIDORE SCHOOL

EXISTING RESIDENTIAL

EXISTING RESIDENTIAL 1015 MARCH RD

FUTURE CLARIDGE

FUTURE SCHOOL PROPERTY

C.E.P.E.O.

MARCHBROOK

CELTIC RIDGE CRESCENT

CONNECTION TO EXISTING 200mm WATERMAIN

MAX 210L/s

MAX 233L/s

MAX 226L/s

MAX 226L/s

MAX 160L/s

ALL ON-SITE NODES REPRESENT SYSTEM LEVEL DEMANDS AS PER STANTEC'S POTABLE WATER ASSESSMENT, MARCH 28, 2016.

SEE MINTO CONNECTION PLAN. SCALE 1:10000

LEGEND

- PROPERTY LINE
- P5 — PROPOSED BACKBONE WATERMAIN AS PER KANATA NORTH MASTER SERVICING STUDY - COMPLETED BY NOVATECH, JUNE 28, 2016 (WATER ANALYSIS BY STANTEC)
- P5 — PROPOSED LOCAL WATERMAIN AND ID NUMBER
- P5 — FUTURE CONCEPTUAL WATERMAIN AND ID NUMBER
- (1) PROPOSED NODE AND ID NUMBER
- R1 EXISTING RESERVOIR AND ID NUMBER
- MAX 160L/s (1) MAXIMUM ACHIEVABLE FIREFLOW
- (1) FUTURE CONCEPTUAL NODE AND ID NUMBER

NOTES:
1) UNLESS OTHERWISE NOTED, A FIREFLOW OF 167L/s HAS BEEN ANALYSED, AS PER STANTEC'S POTABLE WATER ASSESSMENT, DATED MARCH 2016.
2) HIGH DENSITY FIREFLOWS TO BE CONFIRMED AND ANALYZED AT DETAILED DESIGN / SITE PLAN APPLICATION STAGE.

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
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Website www.novatech-eng.com

CITY OF OTTAWA

CU DEVELOPMENTS INC.
1053, 1075 and 1145 MARCH ROAD

WATERMAIN NETWORK NODE LOCATIONS - SCENARIO 2 - FULL KNUEA BUILDOUT AS PER MSS AND STANTEC MODEL (SYSTEM LEVEL DEMAND)

SCALE 1 : 5000 (0, 50, 100, 150, 200)

DATE APR 2020 | JOB 116132 | FIGURE FIG-WM2

Population and Consumption Rate Calculations

Node	Number of Single Units	Number of Townhouse Units	Number of Multi-Unit Townhouse Units	Number of Multi-Unit Apartment Units	Number of Multi-Unit Flats	Multi-Use / Commerical Area (ha)	*Institutional Area (ha)	Residential Population	Consumption Rates (L/s)		
									Average Daily	Maximum Daily	Maximum Hourly
N_KNE07		6						16	0.05	0.13	0.29
N2		7						19	0.06	0.15	0.34
							3.78	0	1.23	1.84	3.31
N3a								0	0.00	0.00	0.00
N3b	8							27	0.09	0.22	0.48
N4		7						19	0.06	0.15	0.34
N_KNE18		10						27	0.09	0.22	0.48
N5a					48			101	0.33	0.82	1.80
N5b								0	0.00	0.00	0.00
N_KNE25			29	29				131	0.42	1.06	2.33
N6								0	0.00	0.00	0.00
N7a								0	0.00	0.00	0.00
N7b							0.83	0	0.27	0.40	0.73
N_KNE02								0	0.00	0.00	0.00
N8a	8							27	0.09	0.22	0.48
N8b		3						8	0.03	0.07	0.14
N9a		7						19	0.06	0.15	0.34
N9b	10							34	0.11	0.28	0.61
N10		3						8	0.03	0.07	0.14
N11	15							51	0.17	0.41	0.91
N12	12							41	0.13	0.33	0.73
N_KNE22	4							14	0.04	0.11	0.24
N13a	12							41	0.13	0.33	0.73
N13b	10							34	0.11	0.28	0.61
N14	7							24	0.08	0.19	0.42
N15	9							31	0.10	0.25	0.55
N16	17							58	0.19	0.47	1.03
N17a	1	8						25	0.08	0.20	0.45
N17b		2						5	0.02	0.04	0.10
N18a		9						24	0.08	0.20	0.43
N18b		8						22	0.07	0.18	0.39
N19a		7						19	0.06	0.15	0.34
N19b		15						41	0.13	0.33	0.72
N20a		16						43	0.14	0.35	0.77
N20b		20						54	0.18	0.44	0.96
N_KNE08		6						16	0.05	0.13	0.29
N21a								0	0.00	0.00	0.00
N21b		21						57	0.18	0.46	1.01
N_KNE09		13						35	0.11	0.28	0.63
N22a								0	0.00	0.00	0.00
N29a								0	0.00	0.00	0.00
N29b		18						49	0.16	0.39	0.87
N30		26						70	0.23	0.57	1.25
N31		26						70	0.23	0.57	1.25
N32								0	0.00	0.00	0.00
N33a								0	0.00	0.00	0.00
N33b		1						3	0.01	0.02	0.05
N34a		11						30	0.10	0.24	0.53
N34b		11	25	25				142	0.46	1.15	2.53
N_KNE03**	5	14	8	8				91	0.29	0.74	1.62

N48					42			88	0.29	0.71	1.57
N49					48			101	0.33	0.82	1.80
N50						0.33		0	0.11	0.16	0.29
N51						1.02		0	0.33	0.50	0.89
TOTAL ONSITE PH. 1	**234**	**355**	**79**	**78**		**1.35**	**6.67**	**2398**	**10.37**	**23.32**	**49.75**

****Values are based on Stantec report. Values represent demand from future buildouts.
***Assumes existing single lot along roadway will ultimately become 2 single units.
**Assumes north half of property is 50% towns and 50% singles at same density as CU lands (25 singles/ha, 47 towns/ha), south half of property assumed to be multi unit residential at same density as CU lands (62.8units/ha).

Notes:
1) Nodes with prefixes N_KNE## are the Same Identification and Approximate Location of Nodes within Stantec's Kanata North Urban Expansion (KNUEA) Potable Water Assessment, dated March 28, 2016

Water Demand Parameters For Claridge / Uniform Site - As per City of Ottawa Guidelines

Single Residential Units	3.4	persons/unit
Townhouse Residential Units	2.7	persons/unit
Multi-Unit Residential (Townhouse)	2.7	persons/unit
Multi-Unit Flats	2.1	persons/unit
Multi-Unit Residential (Apartment)	1.8	persons/unit

Water Demand Parameters For Claridge / Uniform Site (Local Demand as per City of Ottawa Guidelines - Water Distribution Systems)

Residential Demand - Single (low density)	280.0	L/c/day
Residential Demand - Street Town (med. density)	280.0	L/c/day
Residential Demand - Multi-Unit Town (med. density)	280.0	L/c/day
Residential Demand - Apartment (high density)	280.0	L/c/day
Residential Max Day	2.5	x Avg Day
Residential Peak Hour	2.2	x Max Day
Commercial/Intitutional Demand	28000	L/Gross ha/Day
Commerical/Institutional Max Day	1.5	x Avg Day
Commerical/Institutional Peak Hour	1.8	x Max Day
Residential Fire Flow (Typical)	133	L/s
Residential Fire Flow Cap (Typical)	167	L/s
Multi-Unit Flats Fire Flow (Typical)	250	L/s

Notes:
1) Fireflows of 167L/s have been applied based on Stantec's Potable Water Assessment (March 28, 2016) and is the maximum (capped) fireflow for single/townhouse units as per City of Ottawa Technical Bulletin ISDTB-2014-02.
2) Maximum achievable fireflows have been indicated (fireflow summary) in High Density residential areas.
3) Fireflow values have been distributed over several hydrants as per Technical Bulletin ISTB-2018-02.

SEE MINTO CONNECTION PLAN

CONNECTION TO WATERMAIN

CONNECTION TO WATERMAIN

MAXWELL ROAD

MARCH

MARCH ROAD

MURPHY CRESCENT

EXISTING ST.ISIDORE ROMAN CATHOLIC PARISH

EXISTING ST.ISIDORE SCHOOL

EXISTING CEMETERY

EXISTING RESIDENTIAL 1055 MARCH RD

EXISTING RESIDENTIAL 1015 MARCH RD

FUTURE CLARIDGE

FUTURE SCHOOL PROPERTY

BUCKBEAN STREET

BOSCH STREET

SALINGER STREET

DANDELION STREET

WHITLOW GRASS STREET

HAGUE STREET

ROTTERDAM STREET

SPOOR STREET

C.E.P.E.O.

MARCHBROOK

Park and Ride

Fire Hall

2.13 Ha

400mmØ WM

300mmØ WM

200mmØ WM

P1 P2A P2B P4 P5 P6 P7 P8 P9 P10A P10B P11 P12A P12B P13 P14A P14B P15A P15B P16A P16B P17 P18 P19 P20A P20B P21 P22 P23 P24 P25 P26A P26B P27A P27B P28A P28B P29 P30 P31A P31B P32 P33A P33B P34 P35A P46 P47 P48 P49 P50B P51A P51B P52 P53A P53B P54 P74 P75 P76 P77 P77B P78 P79 P80 P81 P83 P84 P85 P86 P87 P88 R1

KNE 01 KNE 02 KNE 03 KNE 04 KNE 05 KNE 06 KNE 07 KNE 08 KNE 09 KNE 10 KNE 11 KNE 12 KNE 13 KNE 14 KNE 15 KNE 16 KNE 17 KNE 18 KNE 19 KNE 20 KNE 21 KNE 22

1 2 3a 3b 4 5a 5b 6 7a 7b 8a 8b 9a 9b 10 11 12 13a 13b 14 15 16 17a 17b 18a 18b 19a 19b 20a 20b 21a 21b 22a 22b 29a 29b 30 31 32 33a 33b 34a 34b 48 49 50 51 54

MAX 257L/s

MAX 233L/s

WATERMAIN ALONG MARCH ROAD SIZED AS PER MASTER SERVICING STUDY - KANATA NORTH. TO BE CONSTRUCTED PRIOR TO COPPERWOOD ESTATE CONNECTIONS.

CONNECTION TO EXISTING 200mm WATERMAIN

ALL ON-SITE NODES REPRESENT LOCAL DEMANDS (CLARIDGE /UNIFORM) AS PER THE CITY OF OTTAWA DESIGN GUIDELINES - WATER DISTRIBUTION SYSTEMS

SEE MINTO CONNECTION PLAN SCALE 1:20000

LEGEND

- PROPERTY LINE
- P5 — PROPOSED BACKBONE WATERMAIN AS PER KANATA NORTH MASTER SERVICING STUDY - COMPLETED BY NOVATECH, JUNE 28, 2016 (WATER ANALYSIS BY STANTEC)
- P5 — PROPOSED LOCAL WATERMAIN AND ID NUMBER
- 1 — PROPOSED NODE AND ID NUMBER
- R1 — EXISTING RESERVOIR AND ID NUMBER
- MAX 160L/s 1 — MAXIMUM ACHIEVABLE FIREFLOW

NOTES:
1) UNLESS OTHERWISE NOTED, A FIREFLOW OF 167L/s HAS BEEN ANALYSED, AS PER STANTEC'S POTABLE WATER ASSESSMENT, DATED MARCH 2016.
2) HIGH DENSITY FIREFLOWS TO BE CONFIRMED AND ANALYZED AT DETAILED DESIGN / SITE PLAN APPLICATION STAGE.

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CITY OF OTTAWA

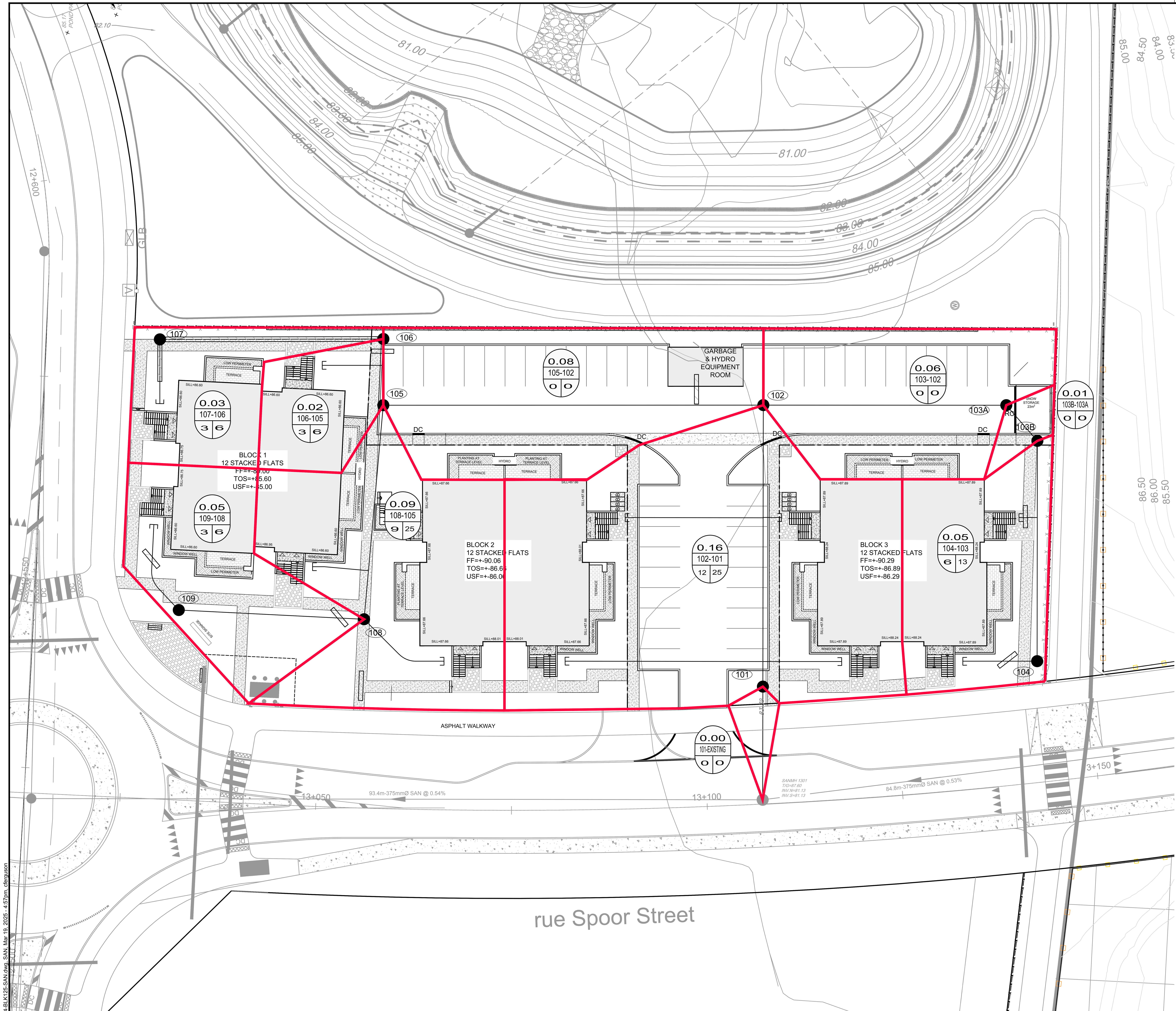
COPPERWOOD ESTATE
1053, 1075 and 1145 MARCH ROAD

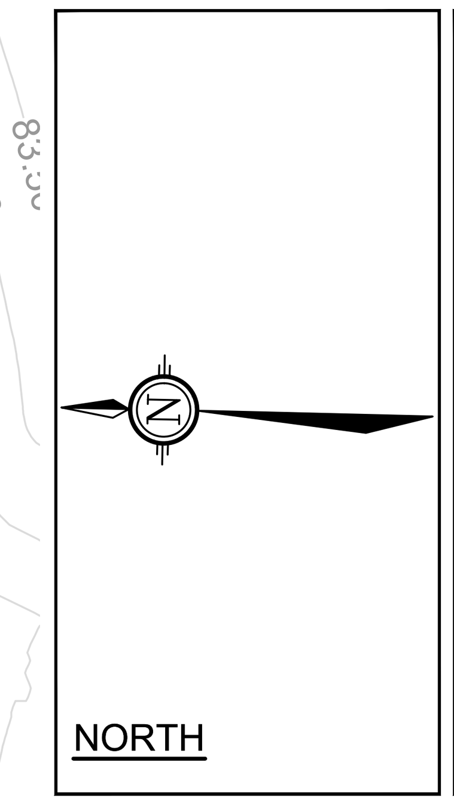
WATERMAIN NETWORK NODE LOCATIONS - COPPERWOOD ESTATE DESIGN DEMAND WITH KNUEA ALLOWANCES

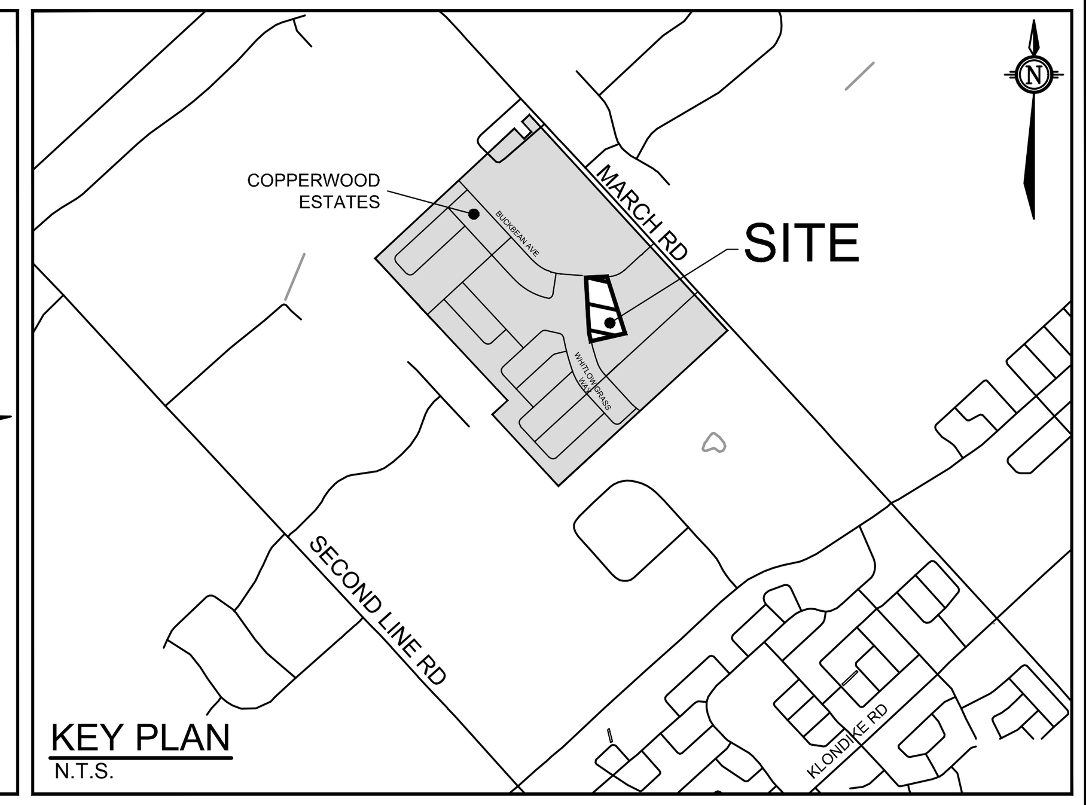
SCALE 1 : 5000 (0 50 100 150 200)

DATE NOV 2022 | JOB 116132 | FIGURE FIG-WM1

Appendix C
Sanitary Servicing







LEGEND

- SITE PROPERTY LINE
- MISC LEGAL LINE (EASEMENT, PROPERTY LINES) REFER TO LEGAL PLAN FOR DETAILS
- PROPOSED SIDEWALK
- PROPOSED CURB
- DC PROPOSED DEPRESSED CURB
- PROPOSED ASPHALT DRIVEWAY
- SWALE c/w SUBDRAIN AND DIRECTION OF FLOW
- PROPOSED SANITARY MANHOLE
- 101 PROPOSED SANITARY SEWER AND FLOW DIRECTION
- SANITARY DRAINAGE AREA BOUNDARY
- AREA / 110-108 / 24 51 — AREA IN HECTARES; MANHOLE TO MANHOLE; POPULATION EQUIVALENT
- SAN MH — EXISTING SANITARY MANHOLE & SEWER

REFER TO 122144-ND FOR ADDITIONAL NOTES & DETAILS

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

NOT FOR CONSTRUCTION

No.	REVISION	DATE	BY
2.	REVISED PER COMPLETENESS REVIEW COMMENTS	MAY 09/25	GJM
1.	ISSUED FOR SITE PLAN APPLICATION	MARCH 21/25	GJM

SCALE 1:250

DESIGN	ARM/AM
CHECKED	ARM
DRAWN	ARM/CJF/AM
CHECKED	ARM
APPROVED	GJM

FOR REVIEW ONLY

ISSUED FOR REVIEW

ISSUED FOR REVIEW

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
1101 SPOOR STREET, CITY OF OTTAWA
COPPERWOOD FLATS - BLOCK 125

DRAWING NAME
SANITARY DRAINAGE PLAN

PROJECT No. 122144
REV REV#2
DRAWING No. 122144-SAN

D07-12-25-0039

M:\2022\122144\BLOCK 30\CAD\Civil\122144-BLK125-SAN.dwg, SAN, Mar 19, 2025 - 4:57pm, cferguson

SANITARY SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122144
Project Name: Copperwood Flats - Block 125
Date: 3/19/2025
Reviesed 05/08/2025 (Anthony Mestwarp)
Input By: Curtis Ferguson, E.I.T.
Reviewed By: Anthony Mestwarp, P.Eng.
Drawing Reference: 122144-SAN

Legend:
- Design Input by User
- As-Built Input by User
- Cumulative Cell
- Calculated Design Cell Output
- Calculated Annual Cell Output
- Calculated Rare Cell Output

Reference: City of Ottawa - Sewer Design Guidelines (2012 and TBs)
MOE - Design Guidelines for Sewage Works (2008)

Location				Demand													Design Capacity							
				Residential Flow											Extraneous Flow Area Method		Total Design Flow	Proposed Sewer Pipe Sizing / Design							
Street	Area ID	From MH	To MH	Singles	Semis / Towns	Stk. Towns	Park Area	Population (in 1000's)	Cumulative Population (in 1000's)	Average Pop. Flow Q(q) (L/s)	Design Peaking Factor M	Peak Design Pop. Flow Q(p) (L/s)	Res. Drainage Area (ha.)	Cumulative Res. Drainage Area (ha.)	Cumulative Extraneous Drainage Area (ha.)	Design Extraneous Flow Q(e) (L/s)	Total Peak Design Flow Q(D) (L/s)	Pipe Length (m)	Pipe Size (mm) and Material	Pipe ID Actual (m)	Roughness n	Design Grade So (%)	Capacity Qfull (L/s)	Full Flow Velocity (m/s)	Q(D) / Qfull
Copperwood Flats	A1	107	106			3		0.006	0.006	0.02	3.75	0.08	0.034	0.034	0.034	0.01	0.09	28.5	200 PVC	0.203	0.013	1.00	34.2	1.06	0.3%
Copperwood Flats	A2	106	105			3		0.006	0.013	0.04	3.72	0.15	0.022	0.056	0.056	0.02	0.17	8.4	200 PVC	0.203	0.013	1.00	34.2	1.06	0.5%
Copperwood Flats	A3	109	108			3		0.006	0.006	0.02	3.75	0.08	0.050	0.050	0.050	0.02	0.09	23.7	200 PVC	0.203	0.013	1.10	35.9	1.11	0.3%
Copperwood Flats	A5	108	105			9		0.019	0.025	0.08	3.69	0.30	0.086	0.136	0.136	0.04	0.35	27.4	200 PVC	0.203	0.013	0.95	33.4	1.03	1.0%
Copperwood Flats	A6	105	102					0.000	0.038	0.12	3.67	0.45	0.079	0.270	0.270	0.09	0.54	48.5	200 PVC	0.203	0.013	1.50	41.9	1.29	1.3%
Copperwood Flats	A7	104	103B			6		0.013	0.013	0.04	3.72	0.15	0.052	0.052	0.052	0.02	0.17	28.1	200 PVC	0.203	0.013	1.96	47.9	1.48	0.4%
Copperwood Flats	A8	103B	103A			0		0.000	0.013	0.04	3.72	0.15	0.005	0.057	0.109	0.04	0.19	6.0	200 PVC	0.203	0.013	2.00	48.4	1.49	0.4%
Copperwood Flats	A8	103A	102					0.000	0.013	0.04	3.72	0.15	0.060	0.117	0.117	0.04	0.19	31.0	200 PVC	0.203	0.013	2.00	48.4	1.49	0.4%
Copperwood Flats	A9	102	101			12		0.025	0.076	0.25	3.62	0.89	0.162	0.550	0.550	0.18	1.07	35.9	200 PVC	0.203	0.013	2.00	48.4	1.49	2.2%
rue Spoor Street	A10	101	EX					0.000	0.076	0.25	3.62	0.89	0.005	0.554	0.554	0.18	1.07	14.4	200 PVC	0.203	0.013	2.00	48.4	1.49	2.2%
Totals				**0**	**0**	**36**	**0.000**	**0.076**	**0.076**	**0.25**	**3.62**	**0.89**	**0.554**	**0.554**	**0.554**	**0.18**	**1.07**	**251.9**							

Demand Equation / Parameters

1. **Q(D), Q(A), Q(R) =** Q(p) + Q(fd) + Q(ici) + Q(e)
2. **Q(p) =** (P x q x M x K / 86,400)
3. **q =**
   - 280 L/per person/day (design)
   - 200 L/per person/day (annual and rare)
4. **M = Harmon Formula (maximum of 4.0)**
5. **K =**
   - 0.8 (design)
   - 0.6 (annual and rare)
6. **Park flow is considered equivalent to a single unit / ha**
   - **Park Demand =** 4 single unit equivalent / park ha (~ 3,600 L/ha/day)
7. **Q(fd) =** 0.45 L/s/unit
8. **Q(ici) =** ICI Area x ICI Flow x ICI Peak
9. **Q(e) =**
   - 0.33 L/s/ha (design)
   - 0.30 L/s/ha (annual)
   - 0.55 L/s/ha (rare)

Definitions

Q(D) = Peak Design Flow (L/s)
Q(A) = Peak Annual Flow (L/s)
Q(R) = Peak Rare Flow (L/s)
Q(p) = Peak Design Population Flow (L/s)
Q(q) = Average Population Flow (L/s)

	Singles	Semis / Towns	Stacked Towns
P = Residential Population =	3.4	2.7	2.1

q = Average Capita Flow
M = Harmon Formula
K = Harmon Correction Factor
Typ. Service Diameter (mm) = 135
Typ. Service Length (m) = 15 15
I/I Pipe Rate (L/mm dia/m/hr) = 0.007
Q(fd) = Foundation Flow (L/s)
Q(ici) = Industrial / Commercial / Institutional Flow (L/s)
Q(e) = Extraneous Flow (L/s)

Institutional / Commercial / Industrial	Industrial	Commercial / Institutional	
Design =	35000	28000	L/gross ha/day
Annual / Rare =	10000	17000	L/gross ha/day
ICI Peak *			
Design =	1.0	1.5	* ICI Peak = 1.0 Default, 1.5 if ICI in contributing area is >20% (design only)
Annual / Rare =		1.0	

Capacity Equation

Q full = $1000*(1/n)*A_p*R^{2/3}*So^{0.5}$

Definitions

Q full = Capacity (L/s)
n = Manning coefficient of roughness (0.013)
A_p = Pipe flow area (m^2)
R = Hydraulic Radius of wetted area (dia./4 for full pipes)
So = Pipe slope/gradient

SANITARY SEWER DESIGN SHEET
1053, 1075 and 1145 March Road
Copperwood Estate- Phase 1

NOVATECH
Engineers, Planners & Landscape Architects

PROJECT # : 116132
DESIGNED BY : MM/SAZ
CHECKED BY : DDB
DATE PREPARED : 6-Jun-18
DATE REVISED : 8-May-19
DATE REVISED : 20-Apr-20
DATE REVISED : 23-Dec-21
DATE REVISED : 4-May-22
DATE REVISED : 9-Dec-22

LOCATION					RESIDENTIAL											COMMERCIAL / INSTITUTIONAL / PARK							INFILTRATION			FLOW	PROPOSED SEWER									
					INDIVIDUAL							CUMULATIVE				COMM		INST		PARK															
STREET	FROM MH	TO MH	Area ID	Total Area (ha.)	Single Units	Semi/ Town Units	Mult-Unit Towns	Multi-Unit Apartment	Multi-Unit Flats	Population (in 1000's)	AREA (ha.)	Population (in 1000's)	AREA (ha.)	PEAK FACTOR M	PEAK POPULATION FLOW Qr(p) (L/s)	AREA (ha.)	Accu. AREA (ha.)	AREA (ha.)	Accu. AREA (ha.)	AREA (ha.)	Accu. AREA (ha.)	PEAK COMM/INST/PARK FLOW Qc(p) (L/s)	Total Area (ha.)	Accu. Total AREA (ha.)	PEAK EXTRAN. FLOW Q(i) (L/s)	PEAK DESIGN FLOW Q(d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	PIPE ID (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak/ Qcap	d/ D_{full}	Actual Velocity
Outlet 1 - Street 1 and March Road																																			
Future Phase 2	FUT	405								0.000		0.078	1.29	3.6	0.92						1.17			2.46	0.81	1.78									
cours Strawberry Walk	405	607	B10	0.25	3					0.010	0.25	0.252	4.31	3.5	2.84		0.00		0.00		1.17	0.05	0.25	5.48	1.81	4.70	79.8	250	254.00	DR 35	0.66	50.4	0.99	9.3%	0.19	0.60
voie Whitlow Grass Way	603	605	B13	0.15		3				0.008	0.15	0.008	0.15	3.7	0.10		0.00		0.00		0.00	0.00	0.15	0.15	0.05	0.15	14.0	200	203.20	DR 35	0.95	33.4	1.03	0.4%		
voie Whitlow Grass Way	605	607	B14	0.70		25				0.068	0.70	0.076	0.85	3.6	0.89		0.00		0.00		0.00	0.00	0.70	0.85	0.28	1.17	92.6	200	203.20	DR 35	0.97	33.7	1.04	3.5%		
voie Whitlow Grass Way	607	609	B15	0.62		21				0.057	0.62	0.384	5.78	3.4	4.26		0.00		0.00		1.17	0.05	0.62	6.95	2.29	6.60	79.5	250	254.00	DR 35	0.55	46.0	0.91	14.4%	0.25	0.64
voie Whitlow Grass Way	609	611								0.000	0.00	0.384	5.78	3.4	4.26		0.00		0.00		1.17	0.05	0.00	6.95	2.29	6.60	7.4	250	254.00	DR 35	0.68	51.2	1.01	12.9%	0.23	0.68
voie Whitlow Grass Way	611	613	B16	0.11						0.000	0.11	0.384	5.89	3.4	4.26		0.00		0.00		1.17	0.05	0.11	7.06	2.33	6.64	51.0	250	254.00	DR 35	0.55	46.0	0.91	14.4%	0.25	0.64
	613	615									0.00	0.384	5.89	3.4	4.26		0.00		0.00		1.17	0.05	0.00	7.06	2.33	6.64	11.3	250	254.00	DR 35	0.71	52.3	1.03	12.7%	0.23	0.69
voie Whitlow Grass Way	615	617	B17	0.44		14				0.038	0.44	0.422	6.33	3.4	4.66		0.00		0.00		1.17	0.05	0.44	7.50	2.48	7.18	47.7	250	254.00	DR 35	0.55	46.0	0.91	15.6%	0.27	0.66
rang Hague Row / Park / voie Whitlow Grass Way	601	703	B18	2.06		30				0.081	1.01	0.081	1.01	3.6	0.95		0.00		0.00	1.05	1.05	0.04	2.06	2.06	0.68	1.67	108.0	200	203.20	DR 35	0.85	31.5	0.97	5.3%		
rang Hague Row	703	705	B19	0.39		11				0.030	0.39	0.111	1.40	3.6	1.29		0.00		0.00		1.05	0.04	0.39	2.45	0.81	2.14	39.2	200	203.20	DR 35	1.30	39.0	1.20	5.5%		
rang Hague Row	705	617								0.000	0.00	0.111	1.40	3.6	1.29		0.00		0.00		1.05	0.04	0.00	2.45	0.81	2.14	41.8	200	203.20	DR 35	2.82	57.5	1.77	3.7%		
voie Whitlow Grass Way	617	619	B20	0.49		16				0.043	0.49	0.576	8.22	3.4	6.26		0.00		0.00		2.22	0.10	0.49	10.44	3.45	9.80	70.1	250	254.00	DR 35	0.57	46.8	0.92	20.9%	0.30	0.72
cer. Rotterdam Circle	901	801	B27b	0.36	5					0.017	0.36	0.017	0.36	3.7	0.20		0.00		0.00		0.00	0.00	0.36	0.36	0.12	0.32	73.4	200	203.20	DR 35	1.20	37.5	1.16	0.9%		
cer. Rotterdam Circle	801	803	B27a	0.08	1					0.003	0.08	0.020	0.44	3.7	0.24		0.00		0.00		0.00	0.00	0.08	0.44	0.15	0.39	12.1	200	203.20	DR 35	1.07	35.4	1.09	1.1%		
cer. Rotterdam Circle	803	805	B21	0.31	5					0.017	0.31	0.037	0.75	3.7	0.44		0.00		0.00		0.00	0.00	0.31	0.75	0.25	0.69	61.2	200	203.20	DR 35	1.69	44.5	1.37	1.6%		
cer. Rotterdam Circle	805	807	B23	0.68	14					0.048	0.68	0.085	1.43	3.6	0.99		0.00		0.00		0.00	0.00	0.68	1.43	0.47	1.47	83.0	200	203.20	DR 35	1.51	42.0	1.30	3.5%		
cer. Rotterdam Circle	807	809	B24	0.49	10					0.034	0.49	0.119	1.92	3.6	1.38		0.00		0.00		0.00	0.00	0.49	1.92	0.63	2.01	70.9	200	203.20	DR 35	1.40	40.5	1.25	5.0%		
cer. Rotterdam Circle	809	619								0.000	0.00	0.119	1.92	3.6	1.38		0.00		0.00		0.00	0.00	0.00	1.92	0.63	2.01	9.8	200	203.20	DR 35	1.95	47.8	1.47	4.2%		
voie Whitlow Grass Way	619	621	B25	0.16		4				0.011	0.16	0.705	10.30	3.3	7.58		0.00		0.00		2.22	0.10	0.16	12.52	4.13	11.80	39.2	250	254.00	DR 35	0.61	48.5	0.96	24.4%	0.34	0.79
voie Whitlow Grass Way	621	907	B26	0.06						0.000	0.06	0.705	10.36	3.3	7.58		0.00		0.00		2.22	0.10	0.06	12.58	4.15	11.82	41.2	250	254.00	DR 35	0.61	48.5	0.96	24.4%	0.34	0.79
place Bosch Place	901	903	B28	0.59	10					0.034	0.59	0.034	0.59	3.7	0.41		0.00		0.00		0.00	0.00	0.59	0.59	0.19	0.60	75.0	250	254.00	DR 35	1.97	87.1	1.72	0.7%	0.00	0.00
place Bosch Place	903	905	B29	0.61	10					0.034	0.61	0.068	1.20	3.6	0.80		0.00		0.00		0.00	0.00	0.61	1.20	0.40	1.20	75.0	250	254.00	DR 35	2.27	93.5	1.84	1.3%	0.08	0.61
place Bosch Place	905	907	B30	0.57	10					0.034	0.57	0.102	1.77	3.6	1.19		0.00		0.00		0.00	0.00	0.57	1.77	0.58	1.77	70.9	250	254.00	DR 35	2.17	91.4	1.80	1.9%	0.08	0.60
cer. Rotterdam Circle	901	1001	B31	0.40	5					0.017	0.40	0.017	0.40	3.7	0.20		0.00		0.00		0.00	0.00	0.40	0.40	0.13	0.34	72.1	200	203.20	DR 35	0.65	27.6	0.85	1.2%		
cer. Rotterdam Circle	1001	1003	B32	0.12	1					0.003	0.12	0.020	0.52	3.7	0.24		0.00		0.00		0.00	0.00	0.12	0.52	0.17	0.42	13.4	200	203.20	DR 35	0.45	23.0	0.71	1.8%		
cer. Rotterdam Circle	1003	1005	B33	0.97	18					0.061	0.97	0.082	1.49	3.6	0.96		0.00		0.00		0.00	0.00	0.97	1.49	0.49	1.45	114.4	200	203.20	DR 35	1.60	43.3	1.33	3.3%		
cer. Rotterdam Circle	1005	1101	B34	0.72	14					0.048	0.72	0.129	2.21	3.6	1.49		0.00		0.00		0.00	0.00	0.72	2.21	0.73	2.22	97.6	200	203.20	DR 35	2.29	51.8	1.60	4.3%		
rle. Spoor Lane	1103	1101	B35	0.34		7				0.019	0.34	0.019	0.34	3.7	0.23		0.00		0.00		0.00	0.00	0.34	0.34	0.11	0.34	53.0	200	203.20	DR 35	0.66	27.8	0.86	1.2%		
rle. Spoor Lane	1101	907	B36	0.25		6				0.016	0.25	0.164	2.80	3.5	1.89		0.00		0.00		0.00	0.00	0.25	2.80	0.92	2.81	82.0	200	203.20	DR 35	0.40	21.6	0.67	13.0%		
place Bosch Place	907	1311	B37	0.56	10					0.034	0.56	1.006	15.49	3.2	10.56		0.00		0.00		2.22	0.10	0.56	17.71	5.84	16.50	82.8	375	381.00	DR 35	0.53	133.2	1.17	12.4%	0.23	0.78
Salinger Street	1315	1313	B38	0.44		8				0.022	0.44	0.022	0.44	3.7	0.26		0.00		0.00		0.00	0.00	0.44	0.44	0.15	0.40	57.8	200	203.20	DR 35	0.80	30.6	0.94	1.3%		
Salinger Street	1313	1311	B39	0.25		5				0.014	0.25	0.035	0.69	3.7	0.42		0.00		0.00		0.00	0.00	0.25	0.69	0.23	0.65	73.6	200	203.20	DR 35	1.13	36.4	1.12	1.8%		
Salinger Street	1311	1309	B40	0.25						0.000	0.25	1.041	16.43	3.2	10.90		0.00		0.00		2.22	0.10	0.25	18.65	6.15	17.15	24.1	375	381.00	DR 35	0.58	139.3	1.22	12.3%	0.23	0.82
Salinger Street	1309	1307				4				0.011	0.00	1.052	16.43	3.2	11.00		0.00		0.00		2.22	0.10	0.00	18.65	6.15	17.25	33.9	375	381.00	DR 35	0.53	133.2	1.17	13.0%	0.23	0.78
Salinger Street	1307	1305	B41	0.23		6				0.016	0.23	1.068	16.66	3.2	11.16		0.00		0.00		2.22	0.10	0.23	18.88	6.23	17.49	44.3	375	381.00	DR 35	0.54	134.4	1.18	13.0%	0.25	0.83
Salinger Street	1305	1303	B42	0.29		7				0.019	0.29	1.087	16.95	3.2	11.34		0.00		0.00		2.22	0.10	0.29	19.17	6.33	17.77	44.5	375	381.00	DR 35	0.54	134.4	1.18	13.2%	0.25	0.83
Salinger Street	1303	1301	B43	0.20						0.000	0.20	1.087	17.15	3.2	11.34		0.00		0.00		2.22	0.10	0.20	19.37	6.39	17.83	84.8	375	381.00	DR 35	0.53	133.2	1.17	13.4%	0.25	0.82
Salinger Street	1301	1215	B44	1.71			29	29	48	0.231	1.71	1.318	18.86	3.2	13.56		0.00		0.00		2.22	0.10	1.71	21.08	6.96	20.62	93.4	375	381.00	DR 35	0.54	134.4	1.18	15.3%	0.27	0.86
Future Phase 3	FUT	1205								0.000		0.251	3.75	3.5	2.84									3.75	1.24	4.07									
Future Phase 3	FUT	307								0.000		0.251	3.52	3.5	2.84									3.52	1.16	4.00									
ch. Goldenseal Road	307	1205	B58	0.17						0.000	0.17	0.251	3.69	3.5	2.84		0.00		0.00		0.00	0.00	0.17	3.69	1.22	4.05	81.5	200	203.20	DR 35	0.68	28.2	0.87	14.4%		
avenue Buckbean Avenue	1205	1207	B59	0.59		15				0.041	0.59	0.542	8.03	3.4	5.91		0.00		0.00		0.00	0.00	0.59	8.03	2.65	8.56	111.2	200	203.20	DR 35	0.58	26.1	0.80	32.9%		
avenue Buckbean Avenue	1207	1209	B60	0.26		7				0.019	0.26	0.561	8.29	3.4	6.11		0.00		0.00		0.00	0.00	0.26	8.29	2.74	8.84	48.1	200	203.20	DR 35	0.65	27.6	0.85	32.1%		
avenue Buckbean Avenue	1209	1211	B61	0.12		3				0.008	0.12	0.569	8.41	3.4	6.19		0.00		0.00		0.00	0.00	0.12	8.41	2.78	8.96	25.0	200	203.20	DR 35	0.72	29.0	0.90	30.9%		
plct. Dandelion Mews	309	311	B62	0.95		35				0.095	0.95	0.095	0.95	3.6	1.10		0.00		0.00		0.00	0.00	0.95	0.95	0.31	1.42	112.2	200	203.20	DR 35	0.45	23.0	0.71	6.2%		
plct. Dandelion Mews	311	313	B63	0.31		11				0.030	0.31	0.124	1.26	3.6	1.44		0.00		0.00		0.00	0.00	0.31	1.26	0.42	1.85	44.5	200	203.20	DR 35	0.45	23.0	0.71	8.1%		
plct. Dandelion Mews	313	315	B64	0.48		16				0.043	0.48	0.167	1.74	3.5	1.92		0.00		0.00		0.00	0.00	0.48	1.74	0.57	2.49	54.3	200	203.20	DR 35	0.45	23.0	0.71	10.9%		
plct. Dandelion Mews	315	317	B65	0.11		2				0.005	0.11	0.173	1.85	3.5	1.98		0.00		0.00		0.00	0.00	0.11	1.85	0.61	2.59	15.5	200	203.20	DR 35	0.45	23.0	0.71	11.3%		
plct. Dandelion Mews	317	1211	B66	0.11						0.000	0.11	0.173	1.96	3.5	1.98		0.00		0.00		0.00	0.00	0.11	1.96	0.65	2.63	73.0	200	203.20	DR 35	1.01	34.4	1.06	7.6%		
avenue Buckbean Avenue	1211	1213	B67	0.22						0.000	0.22	0.742	10.59	3.3	7.94		0.00		0.00		0.00	0.00	0.22	10.59	3.49	11.44	18.6	200	203.20	DR 35	0.59	26.3	0.81	43.5%		
avenue Buckbean Avenue	1213	1215								0.000	0.00	0.742	10.59	3.3	7.94		0.00		0.00		0.00	0.00	0.00	10.59	3.49	11.44	75.4	200	203.20	DR 35	0.70	28.6	0.88	40.0%		

SANITARY SEWER DESIGN SHEET
1053, 1075 and 1145 March Road
Copperwood Estate- Phase 1

NOVATECH
Engineers, Planners & Landscape Architects

PROJECT # : 116132
DESIGNED BY : MM/SAZ
CHECKED BY : DDB
DATE PREPARED : 6-Jun-18
DATE REVISED : 8-May-19
DATE REVISED : 20-Apr-20
DATE REVISED : 23-Dec-21
DATE REVISED : 4-May-22
DATE REVISED : 9-Dec-22

LOCATION					RESIDENTIAL											COMMERCIAL / INSTITUTIONAL / PARK							INFILTRATION			FLOW	PROPOSED SEWER									
					INDIVIDUAL							CUMULATIVE				COMM		INST		PARK																
STREET	FROM MH	TO MH	Area ID	Total Area (ha.)	Single Units	Semi/ Town Units	Mult-Unit Towns	Multi-Unit Apartment	Multi-Unit Flats	Population (in 1000's)	AREA (ha.)	Population (in 1000's)	AREA (ha.)	PEAK FACTOR M	PEAK POPULATION FLOW Qr(p) (L/s)	AREA (ha.)	Accu. AREA (ha.)	AREA (ha.)	Accu. AREA (ha.)	AREA (ha.)	Accu. AREA (ha.)	PEAK COMM/INST/PARK FLOW Qc(p) (L/s)	Total Area (ha.)	Accu. Total AREA (ha.)	PEAK EXTRAN. FLOW Q(i) (L/s)	PEAK DESIGN FLOW Q(d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	PIPE ID (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak/ Qcap	d/ D_{full}	Actual Velocity
FUTURE BLOCK / EXISTING LANDS ACCOUNTED FOR INCLUDING BLOCK 315	FUT / EX	1407		0.00						0.000		0.280	5.69	3.5	3.15		0.00		4.34		0.00	1.41	0.00	10.03	3.31	7.86	69.2	200	203.20	DR 35	0.45	23.0	0.71	34.3%		
Easement - Park&Ride	1407	1409	B77	3.33			25	25		0.113	3.33	0.392	9.02	3.4	4.35		0.00		4.34		0.00	1.41	3.33	13.36	4.41	10.16	103.3	200	203.20	DR 35	0.44	22.7	0.70	44.8%		
Easement - Park&Ride	1409	1215		0.00						0.000		0.392	9.02	3.4	4.35		0.00		4.34		0.00	1.41	0.00	13.36	4.41	10.16	97.2	200	203.20	DR 35	0.44	22.7	0.70	44.8%		
avenue Buckbean Avenue	1215	1217	B68	0.13						0.000	0.13	2.452	38.60	3.0	23.94		0.00		4.34		2.22	1.50	0.13	45.16	14.90	40.34	69.9	375	381.00	DR 35	0.75	158.4	1.39	25.5%	0.34	1.15
avenue Buckbean Avenue	1217	1219	B69	0.14						0.000	0.14	2.452	38.74	3.0	23.94		0.00		4.34		2.22	1.50	0.14	45.30	14.95	40.39	27.1	375	381.00	DR 35	0.75	158.4	1.39	25.5%	0.34	1.15
avenue Buckbean Avenue	1219	1221								0.000	0.00	2.452	38.74	3.0	23.94		0.00		4.34		2.22	1.50	0.00	45.30	14.95	40.39	28.2	375	381.00	DR 35	0.76	159.5	1.40	25.3%	0.34	1.16
																																				0.00
avenue Buckbean Avenue	1221	1223	B78	1.10						0.000	0.27	2.452	39.01	3.0	23.94		0.00	0.83	5.17		2.22	1.77	1.10	46.40	15.31	41.02	99.1	375	381.00	DR 35	0.75	158.4	1.39	25.9%	0.34	1.15
Total Flows - Outlet 1															**23.94**							**1.77**		**46.40**	**15.31**	**41.02**										
Outlet 2 - Street 10 and March Road																																				
place Bosch Place	909	911	A1	1.05					42	0.088	1.05	0.088	1.05	3.6	1.03		0.00		0.00		0.00	0.00	1.05	1.05	0.35	1.38	82.0	250	254.00	DR 35	1.94	86.4	1.71	1.6%		
place Bosch Place	911	913	A2	3.57					48	0.101	0.50	0.189	1.55	3.5	2.16		0.00	3.07	3.07		0.00	0.99	3.57	4.62	1.52	4.68	45.3	250	254.00	DR 35	1.94	86.4	1.71	5.4%		
place Bosch Place	913	915	A3	0.00						0.000	0.00	0.189	1.55	3.5	2.16		0.00		3.07		0.00	0.99	0.00	4.62	1.52	4.68	47.4	250	254.00	DR 35	1.71	81.1	1.60	5.8%		
place Bosch Place	915	917	A4	0.25						0.000	0.00	0.189	1.55	3.5	2.16	0.25	0.25		3.07		0.00	1.08	0.25	4.87	1.61	4.84	75.7	250	254.00	DR 35	1.98	87.3	1.72	5.5%		
place Bosch Place	917	919	A5	2.36						0.000	0.00	0.189	1.55	3.5	2.16	2.36	2.61		3.07		0.00	1.84	2.36	7.23	2.39	6.39	74.9	250	254.00	DR 35	2.15	91.0	1.80	7.0%		
Total Flows - Outlet 2															**2.16**							**1.84**			**2.39**	**6.39**										

Notes:

1. Q(d) = Qr(p) + Q(i) + Qc(p)
2. Q(i) = 0.33 L/sec/ha
3. Qr(p) = (PxqxM/86,400)
3. Qc(p) = (A*q*Pf)/86,400

*Assumes existing single lot along roadway will ultimately become 2 single units.
**Assumes north half of property is 50% towns and 50% singles at same density as CU lands (25 singles/ha, 47 towns/ha), south half of property assumed to be multi unit residential at same density as CU lands (62.8units/ha).

Definitions:

Q(d) = Design Flow (L/sec)
Qr(p) = Population Flow (L/sec), Residential
Q(i) = Extraneous Flow (L/sec)
Qc(p) = Population Flow (L/sec), Commercial/Institutional/Park

P = Population (3.4 persons per single unit, 2.7 persons per townhouse unit, 2.7 persons per multi-unit townhouse unit, 2.1 persons per multi-unit apartment, 1.8 persons per multi-unit apartment)
q = Average per capita flow = 280 L/cap/day - Residential
q = Average per gross ha. flow = 35000 L/gross ha/day - Light industrial
q = Average per gross ha. flow = 28000 L/gross ha/day - Commercial/Institutional
q = Average per gross ha. flow = 3700 L/gross ha/day - Park (20L/day/person, 185 persons/ha - as per Appendix 4-A of the City of Ottawa Sewer Design Guidelines)
M = Harmon Formula (maximum of 4.0), K = Correction Factor = 0.8
Min pipe size 200mm @ min. slope 0.32%
Mannings n = 0.013
Pf = Peak factor (Commercial/Institional/Park) = 1.0 (less than 20% of total contributing areas), 1.5 (if area is 20% or greater of total contributing area)

REFER TO 116132-NL FOR ADDITIONAL NOTES

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
9.			SAZ
8.	REVISED AS PER CITY OF OTTAWA COMMENTS	MAY 19/23	SAZ
7.	REVISED AS PER CITY OF OTTAWA COMMENTS	DEC 9/22	SAZ
6.	REVISED AS PER CITY OF OTTAWA COMMENTS	MAY 4/22	SAZ
5.	ISSUED FOR CITY OF OTTAWA REVIEW	DEC 23/21	MSP
4.	REVISED AS PER CITY OF OTTAWA COMMENTS	NOV 13/20	MSP
3.	REVISED AS PER CITY OF OTTAWA COMMENTS	MAY 8/20	MSP
2.	REVISED AS PER CITY OF OTTAWA COMMENTS	MAY 13/19	MSP
1.	ISSUED FOR DRAFT PLAN OF SUBDIVISION APPLICATION	JULY 23/18	MSP

SCALE 1:1500

1:1500 — 0 15 30 45 60

DESIGN	TJM
CHECKED	SAZ
DRAWN	MTM
CHECKED	SAZ
APPROVED	MSP

CITY OF OTTAWA
COPPERWOOD ESTATE
1053, 1075 AND 1145 MARCH ROAD

DRAWING NAME
SANITARY DRAINAGE AREA PLAN
PHASE 1

PROJECT No. 116132-00
REV: REV # 9
DRAWING No. 116132-SAN

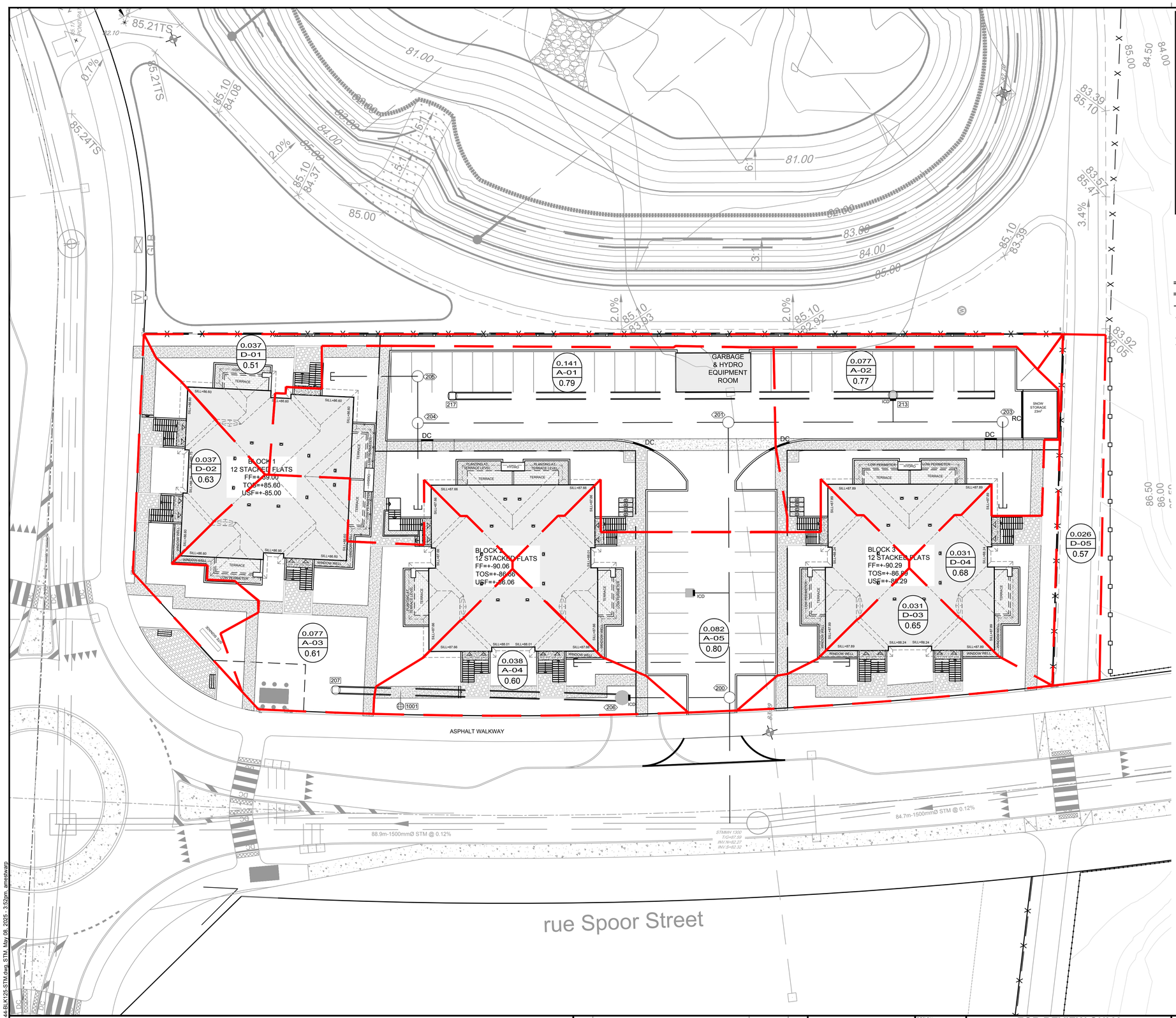
PLANB1.DWG - 1000mmx707mm

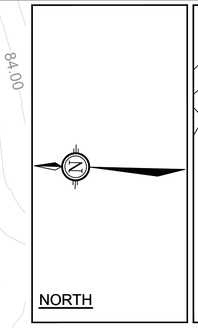
D07-16-18-0023

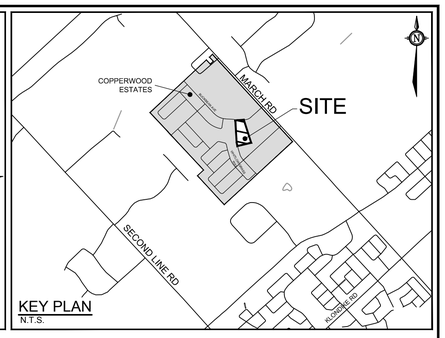
#17801

\\novatech2018\nova2\2016\116132\CAD\Design\116132-SAN.dwg, SAN PH 1, Sep 27, 2024 - 4:26pm, mmckeough

Appendix D
Storm Servicing







LEGEND

- SITE PROPERTY LINE
- MISC LEGAL LINE (EASEMENT, PROPERTY LINES) REFER TO LEGAL PLAN FOR DETAILS
- PROPOSED SIDEWALK
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- SWALE c/w SUBDRAIN AND DIRECTION OF FLOW
- PROPOSED STORM SEWER AND MANHOLE
- PROPOSED STORM MANHOLE C/W ICD
- PROPOSED STORMWATER MANAGEMENT PIPE
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED CATCHBASIN MANHOLE C/W ICD
- PROPOSED CATCHBASIN
- PROPOSED CATCHBASIN C/W ICD
- PROPOSED LANDSCAPE DRAIN
- PROPOSED NOISE WALL
- EXISTING TRANSFORMER WITH BOLLARDS
- EXISTING DITCH CENTRELINE
- EXISTING STORM MANHOLE & SEWER
- EXISTING CATCHBASIN
- EXISTING FENCE
- EXISTING TRAFFIC WIRE
- EXISTING GAS MAIN
- EXISTING BELL LINE
- EXISTING HYDRO
- EXISTING STREETLIGHT WIRE
- EXISTING LIGHT STANDARD

REFER TO 122144-ND FOR ADDITIONAL NOTES & DETAILS

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

NOT FOR CONSTRUCTION

No.	REVISION	DATE	BY
2.	REVISED PER COMPLETENESS REVIEW COMMENTS	MAY 09/25	GJM
1.	ISSUED FOR SITE PLAN APPLICATION	MARCH 21/25	GJM

SCALE 1:250

1:250
0 2 4 6 8 10

DESIGN	ARM/AM
CHECKED	ARM
DRAWN	ARM/CJF/AM
CHECKED	ARM
APPROVED	GJM

FOR REVIEW ONLY

ISSUED FOR REVIEW

ISSUED FOR REVIEW

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
1101 SPOOR STREET, CITY OF OTTAWA
COPPERWOOD FLATS - BLOCK 125

DRAWING NAME
STORMWATER MANAGEMENT PLAN

PROJECT No. 122144
REV REV#2
DRAWING No. 122144-STM

M:\2022\122144\BLOCK 307\CAD\Civil\122144-BLK125-STM.dwg, STM, May 08, 2025 - 3:52pm, amestwarp

D07-12-25-0039

PLANAT.DWG - 841mmx594mm

STORM SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122144
Project Name: Copperwood Flats - Block 125
Date: 2/19/2025
Revised 05/08/2025 (Anthony Mestwarp)
Input By: Anjush Musyaju, E.I.T.
Reviewed By: Anthony Mestwarp, P.Eng.
Drawing Reference: 122144-BLK307-STM

Legend: Design Input by User
As-Built Input by User
Cumulative Cell
Calculated Design Cell Output
Calculated Uncontrolled Peak Flow Cell Output
Design Input Restricted Peak Flow Cell
Reference: City of Ottawa - Sewer Design Guidelines (2012 and TBs)
MOE - Design Guidelines for Sewage Works (2008)

Location				Demand												Design Capacity								
				Area				Flow								Proposed Sewer Pipe Sizing / Design								
Street	Area ID	From MH	To MH	Hard	Grass	Total Area A (ha.)	Weighted Runoff Coefficient C	Indivi. 2.78 AC	Accum. 2.78 AC	Time of Conc. Tc (min.)	Rain Intensity (mm/hr) I				Peak Flow (L/s)	Total Uncontrolled Peak Flow Q (L/s)	Pipe Length (m)	Pipe Size (mm) and Material	Pipe ID Actual (m)	Roughness n	Design Grade So (%)	Capacity Qfull (L/s)	Full Flow Velocity (m/s)	Time of Flow (min.)	Q / Qfull
				0.90	0.20						2-yr	5-yr	10-yr	100-yr											
Block 125		204	201			0.00		0.00	0.00	10.00					0.00	0.0	39.7	250 PVC	0.254	0.013	1.00	62.0	1.22	0.54	0.0%
						0.00		0.00	0.00	10.00					0.00										
						0.00		0.00	0.00	10.00					0.00										
						0.00		0.00	0.00	10.00					0.00										
Block 125	A-01 & A-02	203	201	0.18	0.04	0.22	0.78	0.48	0.48	10.54	74.79				35.55	35.6	35.1	450 PVC	0.4572	0.013	0.30	162.9	0.99	0.59	21.8%
						0.00		0.00	0.00	10.54					0.00										
						0.00		0.00	0.00	10.54					0.00										
						0.00		0.00	0.00	10.54					0.00										
Block 125	A-05	201	200	0.07	0.01	0.08	0.80	0.18	0.66	11.13	72.72				47.97	48.0	34.5	450 PVC	0.4572	0.013	0.30	162.9	0.99	0.58	29.4%
						0.00		0.00	0.00	11.13					0.00										
						0.00		0.00	0.00	11.13					0.00										
						0.00		0.00	0.00	11.13					0.00										
Block 125	A-03 & A-04	206	200	0.07	0.05	0.12	0.61	0.19	0.19	10.00	76.81				14.92	14.9	13.7	250 PVC	0.254	0.013	0.50	43.9	0.87	0.26	34.0%
						0.00		0.00	0.00	10.00					0.00										
						0.00		0.00	0.00	10.00					0.00										
						0.00		0.00	0.00	10.00					0.00										
Block 125		200	Existing			0.00		0.00	0.85	11.71	70.81				60.47	60.5	16.8	450 PVC	0.4572	0.013	0.50	210.3	1.28	0.22	28.8%
						0.00		0.00		11.71					0.00										
						0.00		0.00		11.71					0.00										
						0.00		0.00		11.71					0.00										
Totals				**0.32**	**0.10**	**0.42**	**0.74**										**139.8**								

Demand Equation / Parameters

1. Q = 2.78 ACI

Definitions

Q = Peak flow in litres per second (L/s)
A = Area in hectares (ha)
C = Weighted runoff coefficient (increased by 25% for 100-year)
I = Rainfall intensity in millimeters per hour (mm/hr)

Rainfall intensity is based on City of Ottawa IDF data presented in the City of Ottawa - Sewer Design Guidelines

Capacity Equation

Q full = $1000*(1/n)*A_p*R^{2/3}*So^{0.5}$

Definitions

Q full = Capacity (L/s)
n = Manning coefficient of roughness (0.013)
A_p = Pipe flow area (m^2)
R = Hydraulic Radius of wetted area (dia./4 for full pipes)
So = Pipe slope/gradient

TABLE 0A: Allowable Runoff Coefficient "C"

Area	"C"
Total	0.70
0.580	

TABLE 0B: Allowable Flows

Outlet Options	Area (ha)	"C"	Tc (min)	$Q_{5\ Year}$ (L/s)	Q_{ALLOW} (L/s)
Spoor Street	0.580	0.70	10	**117.6**	**117.6**

Time of Concentration	Tc=	10	min
Intensity (2 Year Event)	I_2=	76.81	mm/hr
Intensity (5 Year Event)	I_5=	104.19	mm/hr
Intensity (100 Year Event)	I_{100}=	178.56	mm/hr

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$
5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

Equations:
Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

PROJECT #: 122144
PROJECT NAME: Copperwood Flats - Block 125
LOCATION: City of Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: March 11, 2025
Revised: May 08,2025

TABLE 1A: Post-Development Runoff Coefficient "C" - D-01

Area	Surface	Ha	"C"	C_{avg}	*C_{100}
Total	Hard	0.016	0.90	0.51	0.58
0.037	Soft	0.021	0.20		

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

* Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100-Year event

TABLE 1B: Post-Development D-01 Flows

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q_{2\ Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
SWMF	0.037	0.51	10	**4.0**	**5.4**	**10.5**

Time of Concentration	Tc=	10	min
Intensity (2 Year Event)	I_2=	76.81	mm/hr
Intensity (5 Year Event)	I_5=	104.19	mm/hr
Intensity (100 Year Event)	I_{100}=	178.56	mm/hr

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$
5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

Equations:
Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

TABLE 2A: Post-Development Runoff Coefficient "C" - D-02

Area	Surface	Ha	"C"	C_{avg}	*C_{100}
Total	Hard	0.022	0.90	0.63	0.71
0.037	Soft	0.014	0.20		

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

* Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100-Year event

TABLE 2B: Post-Development D-02 Flows

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q_{2\ Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
Buckbean Avenue	0.037	0.63	10	**4.9**	**6.6**	**12.8**

Time of Concentration	Tc=	10	min
Intensity (2 Year Event)	I_2=	76.81	mm/hr
Intensity (5 Year Event)	I_5=	104.19	mm/hr
Intensity (100 Year Event)	I_{100}=	178.56	mm/hr

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$
5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

Equations:
Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

TABLE 3A: Post-Development Runoff Coefficient "C" - D-03

Area	Surface	Ha	"C"	C_{avg}	*C_{100}
Total	Hard	0.020	0.90	0.65	0.74
0.031	Soft	0.011	0.20		

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

* Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100-Year event

TABLE 3B: Post-Development D-03 Flows

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q_{2\ Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
Spoor Street	0.031	0.65	10	**4.3**	**5.8**	**11.3**

Time of Concentration	Tc=	10	min
Intensity (2 Year Event)	I_2=	76.81	mm/hr
Intensity (5 Year Event)	I_5=	104.19	mm/hr
Intensity (100 Year Event)	I_{100}=	178.56	mm/hr

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$
5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

Equations:
Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

TABLE 4A: Post-Development Runoff Coefficient "C" - D-04

Area	Surface	Ha	"C"	C_{avg}	*C_{100}
Total	Hard	0.021	0.90	0.68	0.76
0.031	Soft	0.010	0.20		

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

* Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100-Year event

TABLE 4B: Post-Development D-04 Flows

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q_{2\ Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
Shirleys Brook	0.031	0.68	10	**4.5**	**6.1**	**11.7**

Time of Concentration	Tc=	10	min
Intensity (2 Year Event)	I_2=	76.81	mm/hr
Intensity (5 Year Event)	I_5=	104.19	mm/hr
Intensity (100 Year Event)	I_{100}=	178.56	mm/hr

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$
5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

Equations:
Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

TABLE 5A: Post-Development Runoff Coefficient "C" - D-05

Area	Surface	Ha	"C"	C_{avg}	$*C_{100}$
Total	Hard	0.013	0.90	0.57	0.64
0.026	Soft	0.012	0.20		

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

* Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100-Year event

TABLE 5B: Post-Development D-05 Flows

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q_{2\ Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
Shirleys Brook	0.026	0.57	10	**3.1**	**4.2**	**8.2**

Time of Concentration	Tc=	10	min
Intensity (2 Year Event)	I_2=	76.81	mm/hr
Intensity (5 Year Event)	I_5=	104.19	mm/hr
Intensity (100 Year Event)	I_{100}=	178.56	mm/hr

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$
5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

Equations:
Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

TABLE 6A: Post-Development Runoff Coefficient "C" - A-01 & A-02

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.181	0.90	0.78	1.00	0.88
0.218	Roof	0.000	0.90		1.00	
	Soft	0.036	0.20		0.25	

TABLE 6B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-01 & A-02

0.218 =Area (ha)
0.78 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
2 YEAR	15	61.77	29.29	6.9	22.39	20.15
	20	52.03	24.67	6.9	17.77	21.33
	25	**45.17**	**21.42**	**6.9**	**14.52**	**21.78**
	30	40.04	18.99	6.9	12.09	21.76
	35	36.06	17.10	6.9	10.20	21.42

TABLE 6C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-01 & A-02

0.218 =Area (ha)
0.78 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)*	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	20	70.25	33.32	8.300	25.02	30.02
	25	60.90	28.88	8.300	20.58	30.87
	30	**53.93**	**25.57**	**8.300**	**17.27**	**31.09**
	35	48.52	23.01	8.300	14.71	30.89
	40	44.18	20.95	8.300	12.65	30.37

TABLE 6D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-01 & A-02

0.218 =Area (ha)
0.88 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)*	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	20	119.95	63.54	14.86	48.68	58.42
	25	103.85	55.01	14.86	40.15	60.23
	30	**91.87**	**48.66**	**14.86**	**33.80**	**60.85**
	35	82.58	43.74	14.86	28.88	60.66
	40	75.15	39.81	14.86	24.95	59.87

TABLE 6E: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-01 & A-02

0.218 =Area (ha)
0.88 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)*	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR + 20	25	124.62	66.01	15.2	50.81	76.22
	30	110.24	58.40	15.2	43.20	77.76
	35	**99.09**	**52.49**	**15.2**	**37.29**	**78.31**
	40	90.17	47.77	15.2	32.57	78.16
	45	82.86	43.89	15.2	28.69	77.47

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

* Allowable run-off is 50% of the actual flow to calculate the required volume as per city of Ottawa Guidelines for underground storage

PROJECT #: 122144
PROJECT NAME: Copperwood Flats - Block 125
LOCATION: City of Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: March 11, 2025
Revised: May 08,2025

TABLE 6F: Structure Details

Structures	Size Dia.(mm)	Area (m^2)	T/G	Inv OUT
STMMH 217	1500	1.77	86.05	83.97
STMMH 213	1500	1.77	86.75	83.85

TABLE 6G: Pipe Details

Structures	Dia.(mm)	Actual dia (mm)	Area (m^2)	Upstream inv	Down stream invert	Length (m)*
CBMH 217-CBMH 213	750	762	0.46	83.97	83.91	55.20
STUB - CBMH 213	750	762	0.46	83.92	83.91	12.25

* Pipe lengths for volume calculations are inner structure wall to inner structure wall

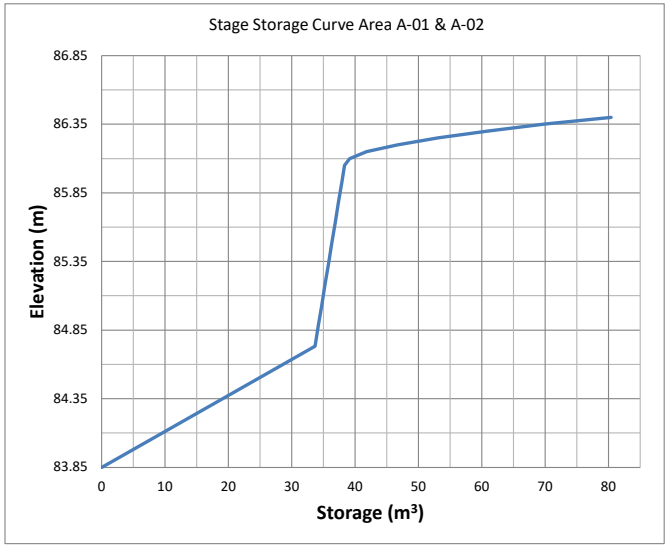


TABLE 6H: Above Ground Storage Provided - A-01 & A-02

Area A-05: Above Ground Ponding

Elevation (m)	STMMH 217 Ponding Depth (m)	STMMH 217 Area* (m^2)	STMMH 213 Ponding Depth (m)	STMMH 213 Area* (m^2)	Storage Volume (m^3)
86.05	0.000	0.798	0.000	-	0.00
86.1	0.050	27.815	0.000	-	0.72
86.15	0.100	76.812	0.000	-	3.33
86.2	0.150	112.067	0.000	-	8.05
86.25	0.200	141.793	0.000	-	14.40
86.3	0.250	166.030	0.000	-	22.10
86.35	0.300	188.865	0.000	-	30.97
86.4	0.350	229.962	0.000	-	41.44

TABLE 6I: Total Storage Provided - A-01 & A-02

Storage Table

Elevation (m)	System Depth (m)	STMMH 217 Volume (m^3)	STMMH 213 Volume (m^3)	Pipe Volume (m^3)	Underground Volume (m^3)*	Ponding Volume (m^3)	**Total Volume (m^3)**
83.850	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
84.732	0.88	1.35	1.56	30.76	33.66	0.00	**33.66**
84.882	1.03	1.61	1.82	-	34.20	0.00	**34.20**
85.032	1.18	1.88	2.09	-	34.73	0.00	**34.73**
85.182	1.33	2.14	2.35	-	35.26	0.00	**35.26**
85.332	1.48	2.41	2.62	-	35.79	0.00	**35.79**
85.482	1.63	2.67	2.88	-	36.32	0.00	**36.32**
85.632	1.78	2.94	3.15	-	36.85	0.00	**36.85**
85.782	1.93	3.20	3.41	-	37.38	0.00	**37.38**
85.932	2.08	3.47	3.68	-	37.91	0.00	**37.91**
86.050	2.20	3.68	3.89	-	38.32	0.00	**38.32**
86.100	2.25	-	3.98	-	38.41	0.72	**39.13**
86.150	2.30	-	4.06	-	38.50	3.33	**41.83**
86.200	2.35	-	4.15	-	38.59	8.05	**46.64**
86.250	2.40	-	4.24	-	38.68	14.40	**53.08**
86.300	2.45	-	4.33	-	38.76	22.10	**60.86**
86.350	2.50	-	4.42	-	38.85	30.97	**69.82**
86.400	2.55	-	4.51	-	38.94	41.44	**80.38**

** Red text indicates ponding above the spill elevation in storms exceeding the 100-yr event.

TABLE 6J: Orifice Sizing information - A-01 & A-02

Control Device
Plate Oriface Dia *94*

Design Event	Flow (L/S)	Head (m)	Elev (m)	Outlet dia. (mm)	Volume (m^3)	Area (m^2)	Equivelent Dia. (mm)
1:2 Year	13.8	0.52	84.42	250	21.78	0.0069	94.0
1:5 Year	16.6	0.77	84.67	250	31.09	0.0069	94.0
1:100 Year	29.7	2.40	86.30	250	60.85	0.0070	94.0
1:100 + 20 Year	30.4	2.49	86.39	250	78.31	0.0070	94.0

The design Head is calculated based on the centre of the orifice at the bottom of the pipe

Orifice Control Sizing
Q = 0.62 x A x (2gh) ^ 0.5
Q is the release rate in m^3/s
A is the orifice area in m^2
g is the acceleration due to gravity, 9.81 m/s^2
h is the head of water above the orifice centre in m
d is the diameter of the orifice in m

TABLE 7A: Post-Development Runoff Coefficient "C" - A-03 & A-04

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.067	0.90	0.61	1.00	0.69
0.115	Roof	0.000	0.90		1.00	
	Soft	0.048	0.20		0.25	

TABLE 7B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-03 & A-04

0.115 =Area (ha)
0.61 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
2 YEAR	25	45.17	8.79	2.2	6.59	9.88
	30	40.04	7.79	2.2	5.59	10.07
	35	**36.06**	**7.02**	**2.2**	**4.82**	**10.12**
	40	32.86	6.39	2.2	4.19	10.07
	45	30.24	5.88	2.2	3.68	9.95

TABLE 7C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-03 & A-04

0.115 =Area (ha)
0.61 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)*	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	30	53.93	10.49	2.500	7.99	14.39
	35	48.52	9.44	2.500	6.94	14.58
	40	**44.18**	**8.60**	**2.500**	**6.10**	**14.63**
	45	40.63	7.91	2.500	5.41	14.60
	50	37.65	7.33	2.500	4.83	14.48

TABLE 7D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-03 & A-04

0.115 =Area (ha)
0.69 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)*	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	35	82.58	18.16	4.10	14.06	29.53
	40	75.15	16.53	4.10	12.43	29.82
	45	**69.05**	**15.19**	**4.10**	**11.09**	**29.93**
	50	63.95	14.07	4.10	9.97	29.90
	55	59.62	13.11	4.10	9.01	29.74

TABLE 7E: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-03 & A-04

0.115 =Area (ha)
0.69 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)*	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR + 20	45	82.86	18.22	4.2	14.02	37.86
	50	76.74	16.88	4.2	12.68	38.03
	55	**71.55**	**15.74**	**4.2**	**11.54**	**38.07**
	60	67.07	14.75	4.2	10.55	37.98
	65	63.18	13.89	4.2	9.69	37.81

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

* Allowable run-off is 50% of the actual flow to calculate the required volume as per city of Ottawa Guidelines for underground storage

PROJECT #: 122144
PROJECT NAME: Copperwood Flats - Block 125
LOCATION: City of Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: March 11, 2025
Revised: May 08,2025

TABLE 7F: Structure Details

Structures	Size Dia.(mm)	Area (m^2)	T/G	Inv OUT
CBMH 207	1500	1.78	86.30	84.25
STMMH 206	1500	1.78	87.74	83.69

TABLE 7G: Pipe Details

Structures	Dia.(mm)	Actual dia (mm)	Area (m^2)	Upstream inv	Down stream invert	Length (m)*
STMMH 207-STMMH 206	750	762	0.46	84.25	84.21	35.20

* Pipe lengths for volume calculations are inner structure wall to inner structure wall

TABLE 7H: Storage Provided - A-03 & A-04

Area A-05: Above Ground Ponding					
Elevation (m)	CBMH 207 Ponding Depth (m)	CBMH 207 Area* (m^2)	STMMH 206 Ponding Depth (m)	STMMH 206 Area* (m^2)	Storage Volume (m^3)
86.3	0.000	0.798	0.000	-	0.00
86.35	0.050	7.141	0.000	-	0.20
86.4	0.100	19.472	0.000	-	0.86
86.45	0.150	39.309	0.000	-	2.33
86.5	0.200	66.852	0.000	-	4.99
86.54	0.240	88.729	0.000	-	8.10
86.59	0.290	88.729	0.000	-	12.54
86.64	0.340	88.729	0.000	-	16.97

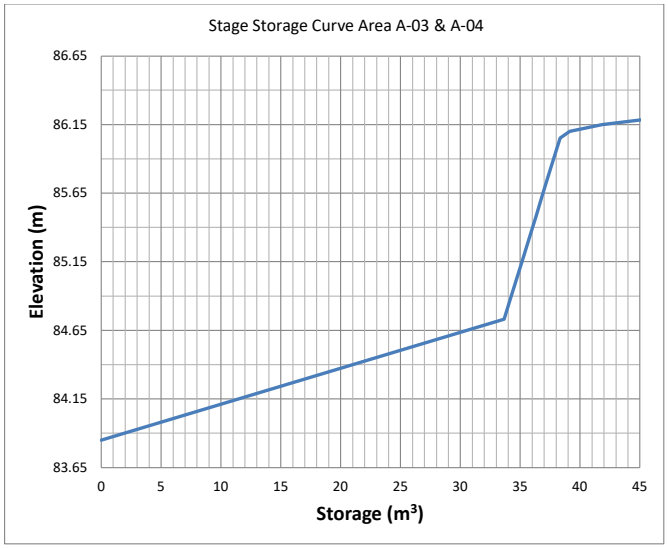


TABLE 7I: Storage Provided - A-03 & A-04

Storage Table							
Elevation (m)	System Depth (m)	CBMH 207 Volume (m^3)	STMMH 206 Volume (m^3)	Pipe Volume (m^3)	Underground Volume (m^3)*	Ponding Volume (m^3)	**Total Volume (m^3)**
83.690	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
84.210	0.52	0.00	0.93	0.00	0.93	0.00	**0.93**
85.012	1.32	1.36	2.35	16.05	19.76	0.00	**19.76**
85.162	1.47	1.62	2.62	-	20.30	0.00	**20.30**
85.312	1.62	1.89	2.89	-	20.83	0.00	**20.83**
85.462	1.77	2.16	3.16	-	21.37	0.00	**21.37**
85.612	1.92	2.43	3.42	-	21.90	0.00	**21.90**
85.762	2.07	2.69	3.69	-	22.44	0.00	**22.44**
85.912	2.22	2.96	3.96	-	22.97	0.00	**22.97**
86.062	2.37	3.23	4.23	-	23.51	0.00	**23.51**
86.212	2.52	3.49	4.49	-	24.04	0.00	**24.04**
86.300	2.61	3.65	4.65	-	24.35	0.00	**24.35**
86.350	2.66	3.74	4.74	-	24.53	0.20	**24.73**
86.400	2.71		4.83	-	24.62	0.86	**25.48**
86.450	2.76		4.92	-	24.71	2.33	**27.04**
86.500	2.81		5.01	-	24.80	4.99	**29.79**
86.540	2.85		5.08	-	24.87	8.10	**32.97**
86.590	2.90	-	5.17	-	24.96	12.54	**37.49**
86.640	2.95	-	5.25	-	25.05	16.97	**42.02**

** Red text indicates ponding above the spill elevation in storms exceeding the 100-yr event.

TABLE 7J: Orifice Sizing information - A-03 & A-04

Control Device							
LMF 75							
Design Event	**Flow (L/S)**	**Head (m)**	**Elev (m)**	**Outlet dia. (mm)**	**Volume (m^3)**	**Area (m^2)**	**Equivelent Dia. (mm)**
1:2 Year	4.4	0.78	84.60	250	10.12	0.0018	48.0
1:5 Year	5.0	0.98	84.80	250	14.63	0.0018	48.0
1:100 Year	8.2	2.69	86.50	250	29.93	0.0018	48.0
1:100 + 20 Year	8.4	2.79	86.60	250	38.07	0.0018	48.0

The design Head is calculated based on the centre of the outlet pipe

Orifice Control Sizing
Q = 0.62 x A x (2gh) ^ 0.5
Q is the release rate in m^3/s
A is the orifice area in m^2
g is the acceleration due to gravity, 9.81 m/s^2
h is the head of water above the orifice centre in m
d is the diameter of the orifice in m

TABLE 8A: Post-Development Runoff Coefficient "C" - A-05

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.071	0.90	0.80	1.00	0.89
0.082	Roof	0.000	0.90		1.00	
	Soft	0.012	0.20		0.25	

TABLE 8B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-05

0.082 =Area (ha)
0.80 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
2 YEAR	0	167.22	30.68	14.1	16.59	0.00
	5	103.57	19.00	14.1	4.91	1.47
	10	**76.81**	**14.09**	**14.1**	**0.00**	**0.00**
	15	61.77	11.33	14.1	-2.76	-2.48
	20	52.03	9.55	14.1	-4.54	-5.45

TABLE 8C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-05

0.082 =Area (ha)
0.80 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	0	230.48	42.29	19.120	23.17	0.00
	5	141.18	25.90	19.120	6.78	2.03
	10	**104.19**	**19.12**	**19.120**	**0.00**	**0.00**
	15	83.56	15.33	19.120	-3.79	-3.41
	20	70.25	12.89	19.120	-6.23	-7.48

TABLE 8D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-05

0.082 =Area (ha)
0.89 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	0	398.62	81.62	25.20	56.42	0.00
	5	242.70	49.69	25.20	24.49	7.35
	10	**178.56**	**36.56**	**25.20**	**11.36**	**6.82**
	15	142.89	29.26	25.20	4.06	3.65
	20	119.95	24.56	25.20	-0.64	-0.77

TABLE 8E: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-05

0.082 =Area (ha)
0.89 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR + 20	0	478.34	97.94	25.9	72.04	0.00
	5	291.24	59.63	25.9	33.73	10.12
	10	**214.27**	**43.87**	**25.9**	**17.97**	**10.78**
	15	171.47	35.11	25.9	9.21	8.29
	20	143.94	29.47	25.9	3.57	4.29

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

PROJECT #: 122144
PROJECT NAME: Copperwood Flats - Block 125
LOCATION: City of Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: March 11, 2025
Revised: May 08,2025

TABLE 8F: Catchbasin

Structures	Size Dia.(mm)	Area (m^2)	T/G	Inv OUT
CB 209	610X610	0.37	87.35	86.15

TABLE 8G: Storage Provided -A-05

Area A-05: Above Ground Ponding			
Elevation (m)	CB 209 Ponding Depth (m)	CB 209 Area* (m^2)	Storage Volume (m^3)
87.35	0.000	0.798	0.00
87.4	0.050	23.264	0.60
87.45	0.100	72.655	3.00
87.5	0.150	138.189	8.27
87.55	0.200	138.189	15.18

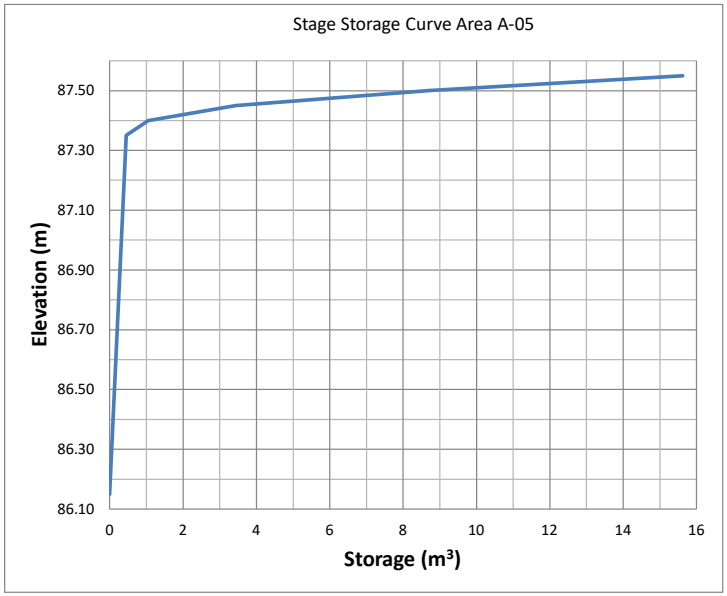


TABLE 8H: Storage Provided - A-05

Storage Table					
Elevation (m)	System Depth (m)	CB 209 Volume (m^3)	Underground Volume (m^3)*	Ponding Volume (m^3)	**Total Volume (m^3)**
86.150	86.15	0.00	0.00	0.00	**0.00**
87.350	87.35	0.45	0.45	0.00	**0.45**
87.400	87.40	-	-	0.60	**1.05**
87.450	87.45	-	-	3.00	**3.45**
87.500	87.50	-	-	8.27	**8.72**
87.550	87.55	-	-	15.18	**15.63**

** Red text indicates ponding above the spill elevation in storms exceeding the 100-yr event.

TABLE 8I: Orifice Sizing information - A-05

Control Device	
Plate Oriface Dia	*102*

Design Event	Flow (L/S)	Head (m)	Elev (m)	Outlet dia. (mm)	Volume (m^3)	Area (m^2)	Equivelent Dia. (mm)
1:2 Year	14.09	0.40	86.66	200	0.00	0.0081	102.0
1:5 Year	19.1	0.72	87.05	200	0.00	0.0082	102.0
1:100 Year	25.2	1.28	87.48	200	6.82	0.0081	102.0
1:100 + 20 Year	25.9	1.31	87.51	200	10.78	0.0082	102.0

The design Head is calculated based on the centre of the orifice at the bottom of the pipe

Orifice Control Sizing
Q = 0.62 x A x (2gh) ^0.5
Q is the release rate in m^3/s
A is the orifice area in m^2
g is the acceleration due to gravity, 9.81 m/s^2
h is the head of water above the orifice centre in m
d is the diameter of the orifice in m

Table 9: Post-Development Stormwater Management Summary

Area ID	Area (ha)	1:5 Year Weighted Cw	1:100 Year Weighted Cw	Control Device		Outlet Location	2 Year Storm Event				5 Year Storm Event				100 Year Storm Event			
							Release (L/s)	Head (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)	Release (L/s)	Head (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)	Release (L/s)	Head (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)
D-01	0.037	0.51	0.58	N/A		SWMF	4.00	N/A	N/A	N/A	5.40	N/A	N/A	N/A	10.50	N/A	N/A	N/A
D-02	0.037	0.63	0.71	N/A		Buckbean Avenue	4.90	N/A	N/A	N/A	6.60	N/A	N/A	N/A	12.80	N/A	N/A	N/A
D-03	0.031	0.65	0.71	N/A		Spoor Street	4.30	N/A	N/A	N/A	5.80	N/A	N/A	N/A	11.30	N/A	N/A	N/A
D-04	0.031	0.68	0.76	N/A		Shirleys Brook	4.50	N/A	N/A	N/A	6.10	N/A	N/A	N/A	11.70	N/A	N/A	N/A
D-05	0.026	0.57	0.64	N/A		Shirleys Brook	3.10	N/A	N/A	N/A	4.20	N/A	N/A	N/A	8.20	N/A	N/A	N/A
A-01-02 (CBMH 213)	0.218	0.78	0.88	Plate Oriface Dia	94	Spoor Street	13.80	0.52	21.78	60.86	16.60	0.77	31.09	60.86	29.72	2.40	60.85	60.86
A-03-04 (STMMH 206)	0.115	0.61	0.69	LMF 75		Spoor Street	4.40	0.78	10.12	32.97	5.00	0.98	14.63	32.97	8.20	2.69	29.93	32.97
A-05 (CB 209)	0.082	0.80	0.89	Plate Oriface Dia	102	Spoor Street	14.09	0.400	0.00	8.72	19.12	0.720	0.00	8.72	25.20	1.280	6.82	8.72
Post-Development Flow							**53.1**	**-**			**68.8**	**-**			**117.6**	**-**	**97.6**	
Total Allowable Release Rate							**117.6**				**117.6**				**117.6**			

Volume III: TEMPEST INLET CONTROL DEVICES

Municipal Technical Manual Series

SECOND EDITION

LMF (Low to Medium Flow) ICD

HF (High Flow) ICD

MHF (Medium to High Flow) ICD

IPEX
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Vol. I, 2nd Edition

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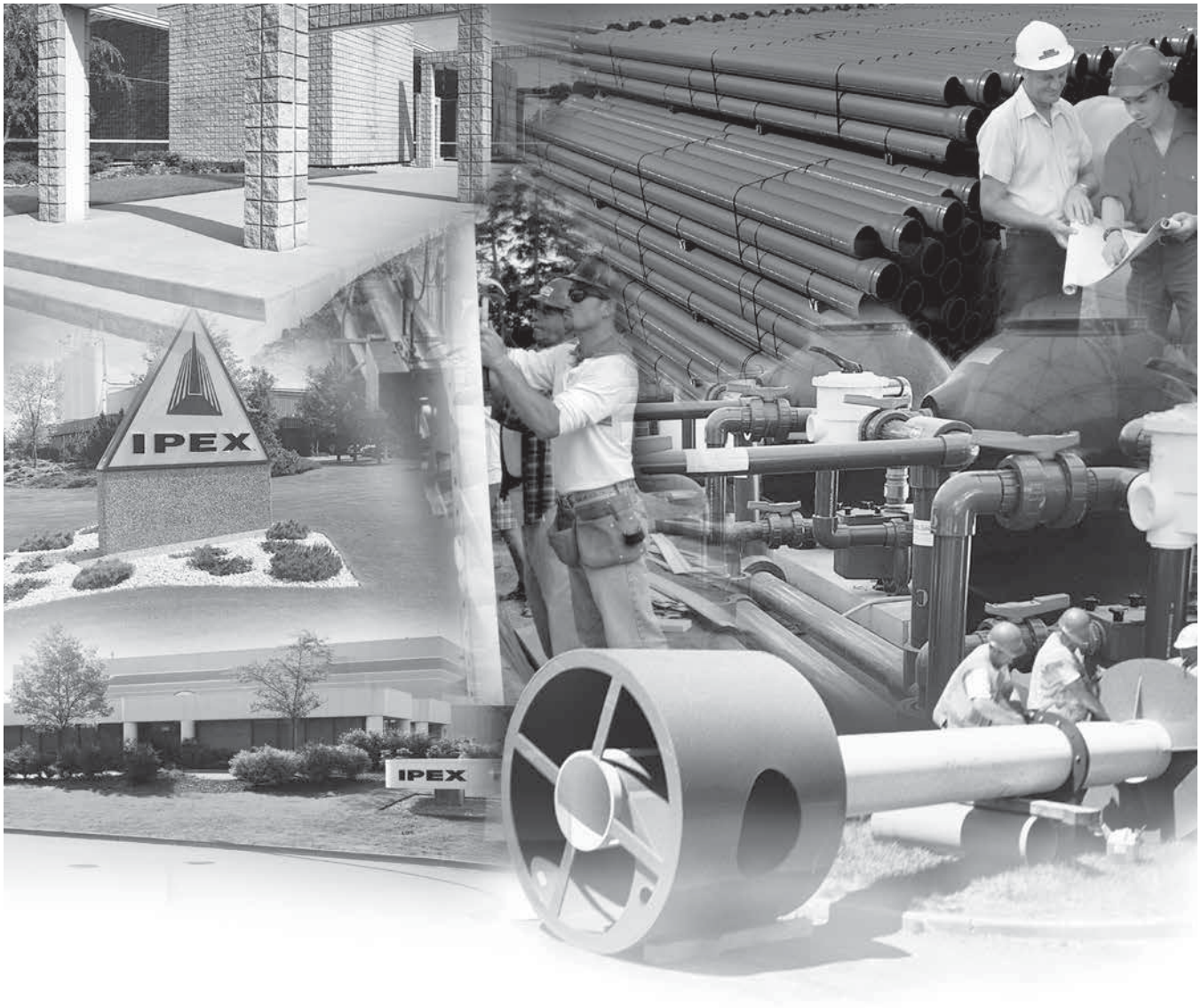


ABOUT IPEX

At IPEX, we have been manufacturing non-metallic pipe and fittings since 1951. We formulate our own compounds and maintain strict quality control during production. Our products are made available for customers thanks to a network of regional stocking locations throughout North America. We offer a wide variety of systems including complete lines of piping, fittings, valves and custom-fabricated items.

More importantly, we are committed to meeting our customers' needs. As a leader in the plastic piping industry, IPEX continually develops new products, modernizes manufacturing facilities and acquires innovative process technology. In addition, our staff take pride in their work, making available to customers their extensive thermoplastic knowledge and field experience. IPEX personnel are committed to improving the safety, reliability and performance of thermoplastic materials. We are involved in several standards committees and are members of and/or comply with the organizations listed on this page.

For specific details about any IPEX product, contact our customer service department.

CONTENTS

PRODUCT INFORMATION: TEMPEST LOW, MEDIUM FLOW (LMF) ICD

Purpose

To control the amount of storm water runoff entering a sewer system by allowing a specified flow volume out of a catch basin or manhole at a specified head. This approach conserves pipe capacity so that catch basins downstream do not become uncontrollably surcharged, which can lead to basement floods, flash floods and combined sewer overflows.

Product Description

Our LMF ICD is designed to accommodate catch basins or manholes with sewer outlet pipes 6" in diameter and larger. Any storm sewer larger than 12" may require custom modification. However, IPEX can custom build a TEMPEST device to accommodate virtually any storm sewer size.

Available in 14 preset flow curves, the LMF ICD has the ability to provide flow rates: 2lps – 17lps (31gpm – 270gpm)

Product Function

The LMF ICD vortex flow action allows the LMF ICD to provide a narrower flow curve using a larger orifice than a conventional orifice plate ICD, making it less likely to clog. When comparing flows at the same head level, the LMF ICD has the ability to restrict more flow than a conventional ICD during a rain event, preserving greater sewer capacity.

Product Construction

Constructed from durable PVC, the LMF ICD is light weight 8.9 Kg (19.7 lbs).

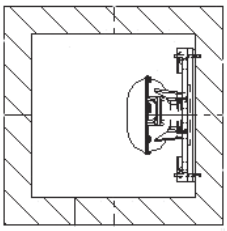
Product Applications

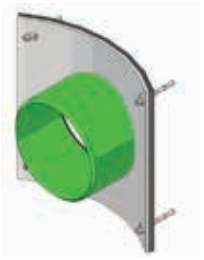
Will accommodate both square and round applications:

Square Application

Round Application

Universal Mounting Plate





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Spigot CB Wall Plate

=

Universal Mounting Plate Hub Adapter

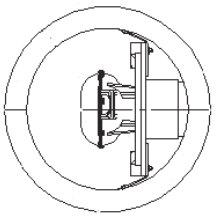


Chart 1: LMF 14 Preset Flow Curves

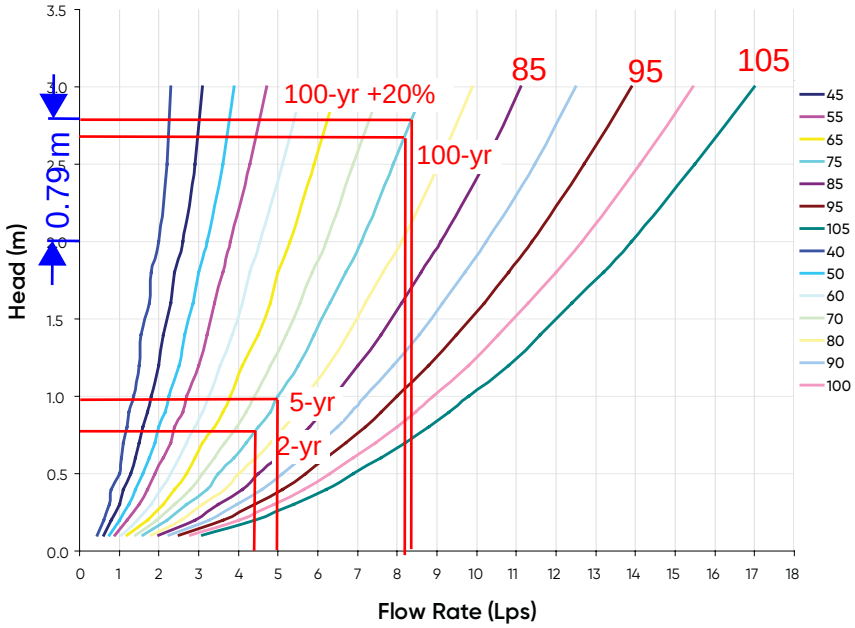
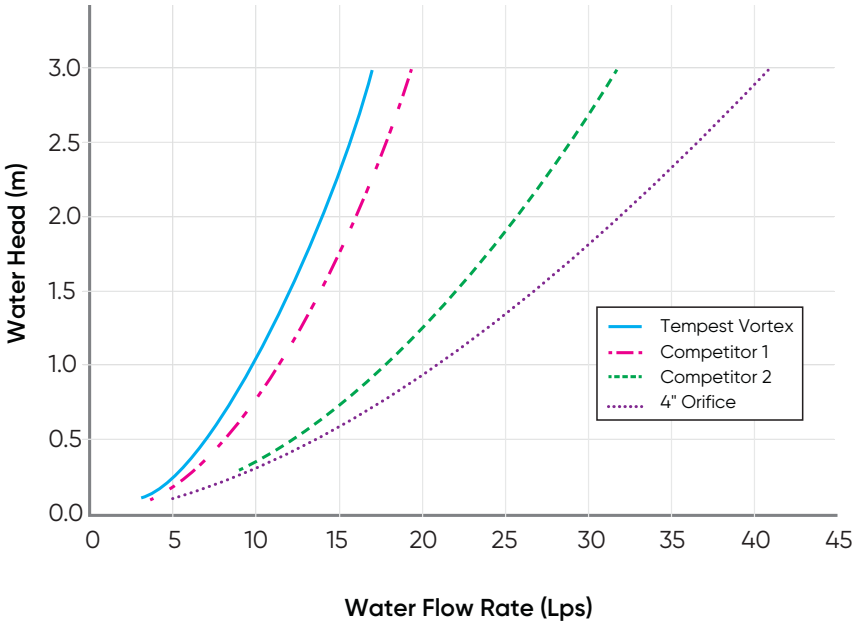


Chart 2: LMF Flow vs. ICD Alternatives



PRODUCT INSTALLATION

Instructions to assemble a TEMPEST LMF ICD into a Square Catch Basin:

STEPS:

1. Materials and tooling verification:
   - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level, and marker.
   - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers, (4) nuts, universal mounting plate, ICD device.
2. Use the mounting wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a minimum of 1-1/2" depth up to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the universal mounting plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the wall mounting plate and the catch basin wall.
6. From the ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the universal mounting plate and has created a seal.

⚠ WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.
- Call your IPEX representative for more information or if you have any questions about our products.

Instructions to assemble a TEMPEST LMF ICD into a Round Catch Basin:

STEPS:

1. Materials and tooling verification.
   - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level and marker.
   - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers and (4) nuts, spigot CB wall plate, universal mounting plate hub adapter, ICD device.
2. Use the spigot catch basin wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a depth between 1-1/2" to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the CB spigot wall plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the spigot wall plate and the catch basin wall.
6. Apply solvent cement on the hub of the universal mounting plate, hub adapter and the spigot of the CB wall plate, then slide the hub over the spigot. Make sure the universal mounting plate is at the horizontal and its hub is completely inserted onto the spigot. Normally, the corners of the universal mounting plate hub adapter should touch the catch basin wall.
7. From ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the mounting plate and has created a seal.

⚠ WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut back the pipe flush to the catch basin wall.
- The solvent cement which is used in this installation is to be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Refer to the IPEX solvent cement guide to confirm the required curing time or visit the IPEX Online Solvent Cement Training Course available at ipexna.com.
- Call your IPEX representative for more information or if you have any questions about our products.

NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

PRODUCT TECHNICAL SPECIFICATION

General

Inlet control devices (ICD's) are designed to provide flow control at a specified rate for a given water head level and also provide odour and floatable control. All ICD's will be IPEX Tempest or approved equal.

All devices shall be removable from a universal mounting plate. An operator from street level using only a T-bar with a hook will be able to retrieve the device while leaving the universal mounting plate secured to the catch basin wall face. The removal of the TEMPEST devices listed above must not require any unbolting or special manipulation or any special tools.

High Flow (HF) Sump devices will consist of a removable threaded cap which can be accessible from street level with out entry into the catchbasin (CB). The removal of the threaded cap shall not require any special tools other than the operator's hand.

ICD's shall have no moving parts.

Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

The inner ring seal will be manufactured using a Buna or Nitrile material with hardness between Duro 50 and Duro 70.

The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

All hardware will be made from 304 stainless steel.

Dimensioning

The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.

PRODUCT INFORMATION: TEMPEST HF & MHF ICD

Product Description

Our HF, HF Sump and MHF ICD's are designed to accommodate catch basins or manholes with sewer outlet pipes 6" in diameter or larger. Any storm sewer larger than 12" may require custom modification. However, IPEX can custom build a TEMPEST device to accommodate virtually any storm sewer size.

Available in 5 preset flow curves, these ICDs have the ability to provide constant flow rates: 9lps (143 gpm) and greater

Product Function

TEMPEST HF (High Flow): designed to manage moderate to higher flows 15 L/s (240 gpm) or greater and prevent the propagation of odour and floatables. With this device, the cross-sectional area of the device is larger than the orifice diameter and has been designed to limit head losses. The HF ICD can also be ordered without flow control when only odour and floatable control is required.

TEMPEST HF (High Flow) Sump: The height of a sewer outlet pipe in a catch basin is not always conveniently located. At times it may be located very close to the catch basin floor, not providing enough sump for one of the other TEMPEST ICDs with universal back plate to be installed. In these applications, the HF Sump is offered. The HF Sump offers the same features and benefits as the HF ICD; however, is designed to raise the outlet in a square or round catch basin structure. When installed, the HF sump is fixed in place and not easily removed. Any required service to the device is performed through a clean-out located in the top of the device which can be often accessed from ground level.

TEMPEST MHF (Medium to High Flow): The MHF plate or plug is designed to control flow rates 9 L/s (143 gpm) or greater. It is not designed to prevent the propagation of odour and floatables.

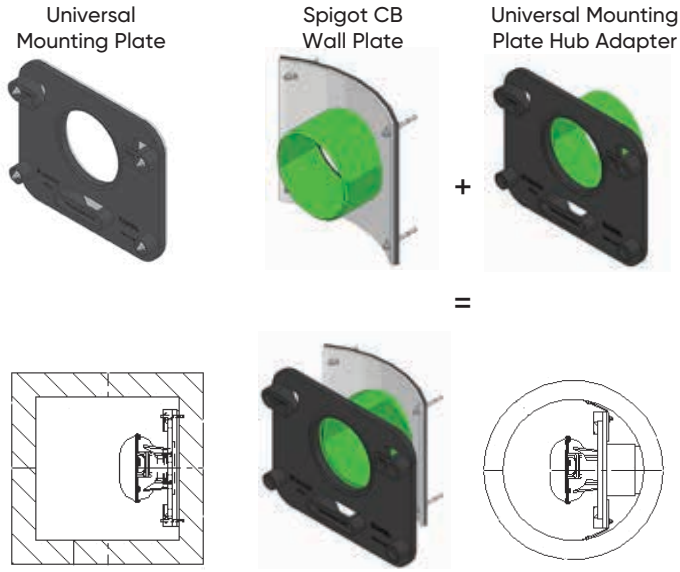
Product Construction

The HF, HF Sump and MHF ICDs are built to be light weight at a maximum weight of 6.8 Kg (14.6 lbs).

Product Applications

The HF and MHF ICD's are available to accommodate both square and round applications:

Square Application **Round Application**



The HF Sump is available to accommodate low to no sump applications in both square and round catch basins:

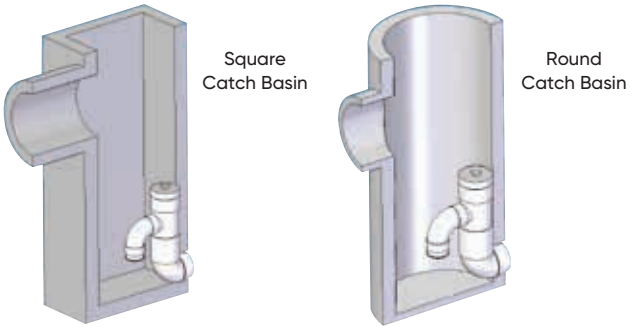
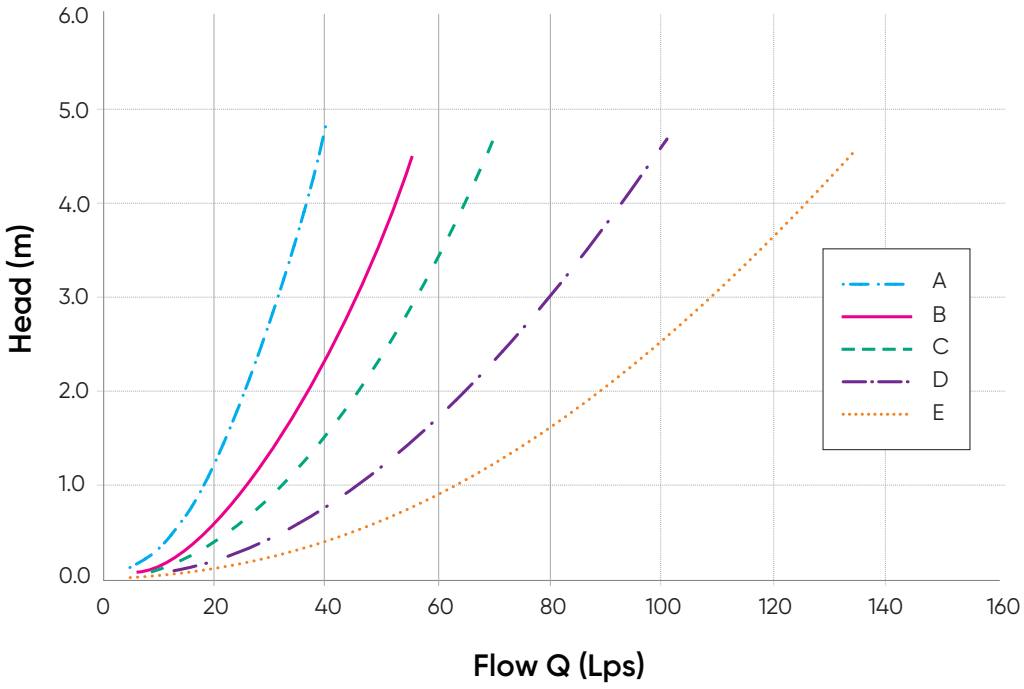


Chart 3: HF & MHF Preset Flow Curves



PRODUCT INSTALLATION

Instructions to assemble a TEMPEST HF or MHF ICD into a Square Catch Basin:

1. Materials and tooling verification:
   - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level, and marker.
   - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers, (4) nuts, universal mounting plate, ICD device
2. Use the mounting wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a minimum of 1-1/2" depth up to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the universal wall mounting plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the wall mounting plate and the catch basin wall.
6. From the ground above using a reach bar, lower the device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the universal wall mounting plate and has created a seal.

⚠ WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.
- Call your IPEX representative for more information or if you have any questions about our products.

Instructions to assemble a TEMPEST HF or MHF ICD into a Round Catch Basin:

STEPS:

1. Materials and tooling verification.
   - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level and marker.
   - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers and (4) nuts, spigot CB wall plate, universal mounting plate hub adapter, ICD device.
2. Use the round catch basin spigot adaptor to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a depth between 1-1/2" to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the spigot CB wall plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the spigot CB wall plate and the catch basin wall.
6. Put solvent cement on the hub of the universal mounting plate, hub adapter and the spigot of the CB wall plate, then slide the hub over the spigot. Make sure the universal mounting plate is at the horizontal and its hub is completely inserted onto the spigot. Normally, the corners of the hub adapter should touch the catch basin wall.
7. From ground above using a reach bar, lower the device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the wall mounting plate and has created a seal.

⚠ WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.
- The solvent cement which is used in this installation is to be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Refer to the IPEX solvent cement guide to confirm the required curing time or visit the IPEX Online Solvent Cement Training Course available at www.ipexinc.com.
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NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

Instructions to assemble a TEMPEST HF Sump into a Square or Round Catch Basin:

STEPS:

1. Materials and tooling verification:
   - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level, mastic tape and metal strapping
   - Material: (2) concrete anchor 3/8 x 3-1/2, (2) washers, (2) nuts, HF Sump pieces (2).
2. Apply solvent cement to the spigot end of the top half of the sump. Apply solvent cement to the hub of the bottom half of the sump. Insert the spigot of the top half of the sump into the hub of the bottom half of the sump.
3. Install the 8" spigot of the device into the outlet pipe. Use the mastic tape to seal the device spigot into the outlet pipe. You should use a level to be sure that the fitting is standing at the vertical.
4. Use an impact drill with a 3/8" concrete bit to make a series of 2 holes along each side of the body throat. The depth of the hole should be between 1-1/2" to 2-1/2". Clean the concrete dust from the 2 holes.
5. Install the anchors (2) in the holes by using a hammer. Put the nuts on the top of the anchors to protect the threads when you hit the anchors. Remove the nuts from the ends of the anchors.
6. Cut the metal strapping to length and connect each end of the strapping to the anchors. Screw the nuts in place with a maximum torque of 40 N.m (30 lbf-ft). The device should be completely flush with the catch basin wall.

⚠ WARNING

- **Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.**
- **The solvent cement which is used in this installation is to be approved for PVC.**
- **The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Refer to the IPEX solvent cement guide to confirm the required curing time or visit the IPEX Online Solvent Cement Training Course available at www.ipexinc.com.**
- **Call your IPEX representative for more information or if you have any questions about our products.**

PRODUCT TECHNICAL SPECIFICATION

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Inlet control devices (ICD's) are designed to provide flow control at a specified rate for a given water head level and also provide odour and floatable control where specified. All ICD's will be IPEX Tempest or approved equal.

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High Flow (HF) Sump devices shall consist of a removable threaded cap which can be accessible from street level with out entry into the catchbasin (CB). The removal of the threaded cap shall not require any special tools other than the operator's hand.

ICD's shall have no moving parts.

Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

The inner ring seal will be manufactured using a Buna or Nitrile material with hardness between Duro 50 and Duro 70.

The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

All hardware will be made from 304 stainless steel.

Dimensioning

The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.

NOTES

SALES AND CUSTOMER SERVICE

IPEX Inc.
Toll Free: (866) 473-9462
ipexna.com

About the IPEX Group of Companies

As leading suppliers of thermoplastic piping systems, the IPEX Group of Companies provides our customers with some of the largest and most comprehensive product lines. All IPEX products are backed by more than 50 years of experience. With state-of-the-art manufacturing facilities and distribution centers across North America, we have established a reputation for product innovation, quality, end-user focus and performance.

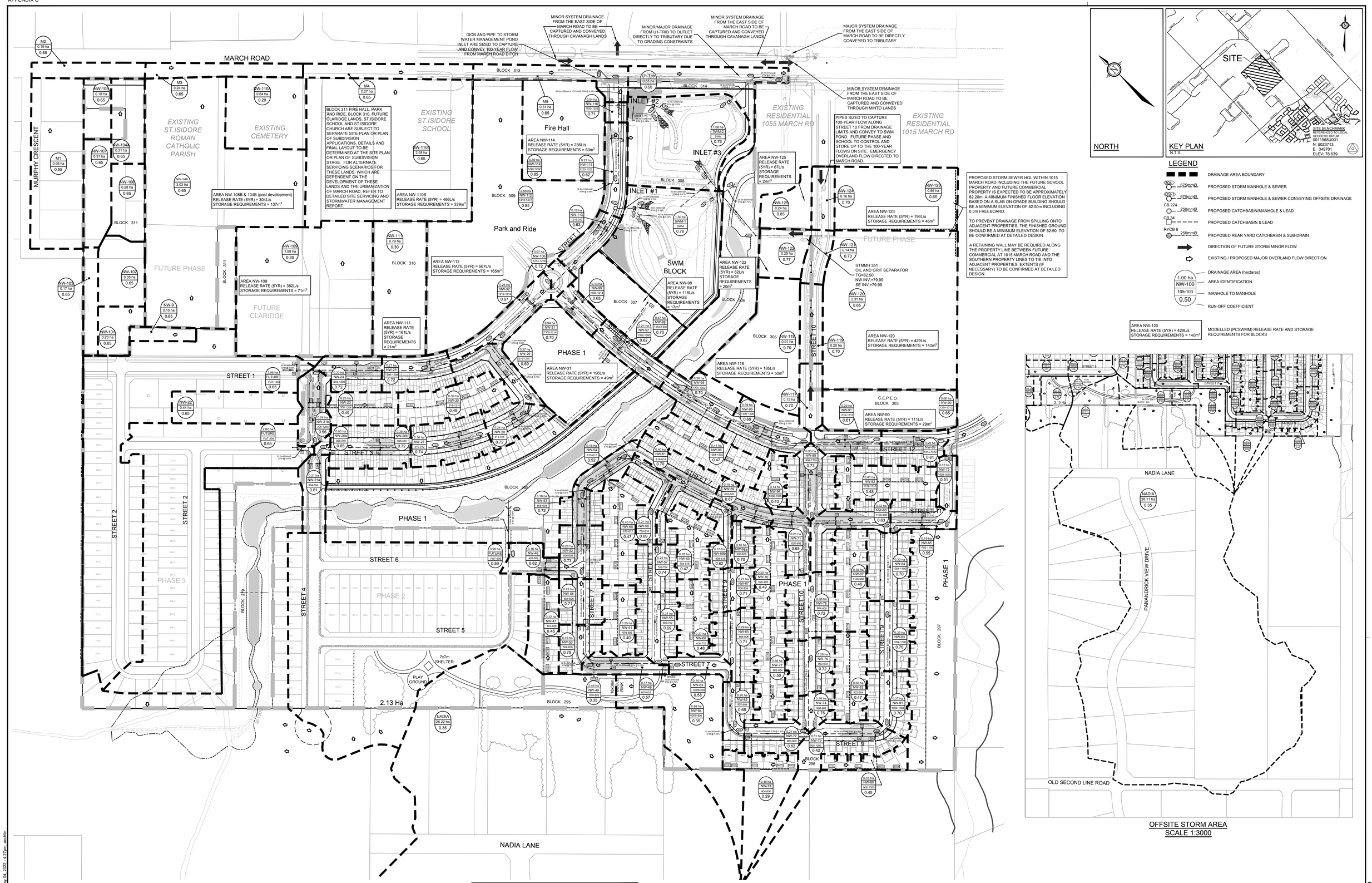
Markets served by IPEX group products are:

- Electrical systems
- Telecommunications and utility piping systems
- PVC, CPVC, PP, ABS, PEX, FR-PVDF and PE pipe and fittings (1/4" to 48")
- Industrial process piping systems
- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- PE Electrofusion systems for gas and water
- Industrial, plumbing and electrical cements
- Irrigation systems

Products manufactured by IPEX Inc.
Tempest™ is a trademark of IPEX Branding Inc.

IPEX by aliaxis

MNMNTPIP110817RC



LEGEND

- DRAINAGE AREA BOUNDARY
- PROPOSED STORM MANHOLE & SEWER
- PROPOSED STORM MANHOLE & SEWER CONVEYING OFFSITE DRAINAGE
- PROPOSED CATCHBASIN/MANHOLE & LEAD
- PROPOSED CATCHBASIN & LEAD
- PROPOSED REAR YARD CATCHBASIN & SUB-DRAIN
- DIRECTION OF FUTURE STORM MINOR FLOWS
- EXISTING / PROPOSED MAJOR OVERLAND FLOW DIRECTION
- DRAINAGE AREA (hectares)
- AREA IDENTIFICATION
- MANHOLE TO MANHOLE
- RUN-OFF COEFFICIENT

AREA NW-120 RELEASE RATE (5YR) = 429L/s STORAGE REQUIREMENTS = 140m³ — MODELLED (PCSWMM) RELEASE RATE AND STORAGE REQUIREMENTS FOR BLOCKS

OFFSITE STORM AREA
SCALE 1:3000

REFER TO 116132-NL FOR ADDITIONAL NOTES

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

PRELIMINARY NOT FOR CONSTRUCTION

No.	REVISION	DATE	BY
7.	REVISED AS PER CITY OF OTTAWA COMMENTS	MAY 4/22	SAZ
6.	ISSUED FOR CITY OF OTTAWA REVIEW	DEC 23/21	MSP
5.	ISSUED TO MISSISSIPPI VALLEY CONSERVATION AUTHORITY FOR REVIEW	DEC 22/21	SAZ
4.	REVISED AS PER CITY OF OTTAWA COMMENTS	NOV 13/20	MSP
3.	REVISED AS PER CITY OF OTTAWA COMMENTS	MAY 8/20	MSP
2.	REVISED AS PER CITY OF OTTAWA COMMENTS	MAY 13/19	MSP
1.	ISSUED FOR DRAFT PLAN OF SUBDIVISION APPLICATION	JULY 23/18	MSP

SCALE 1:1500
1:1500 0 15 30 45 60

DESIGN SAZ
CHECKED DDB
DRAWN RBG
CHECKED SAZ
APPROVED MSP

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER S.A.N. ZORGEL 100191487 PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
COPPERWOOD ESTATE
1053, 1075 AND 1145 MARCH ROAD

DRAWING NAME
STORM DRAINAGE AREA PLAN
PHASE 1

PROJECT No. 116132-00
REV REV # 7
DRAWING No. 116132-STM

D07-16-18-0023

#17801

1053, 1075 and 1145 March Road
Copperwood Estate
Project No.: 116132

STORM SEWER DESIGN SHEET

Copperwood Estate c/w Scenario 1 Servicing Strategy for Future / Existing Lands

FLOW RATES BASED ON RATIONAL METHOD

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION			AREA (ha)			FLOW								TOTAL FLOW	SEWER DATA								
Catchment ID	From Manhole	To Manhole	Area (ha)	C	AC (ha)	Indiv 2.78 AC	Accum 2.78 AC	Time of Concentration	Rainfall Intensity 2 Year (mm/hr)	Rainfall Intensity 5 Year (mm/hr)	Rainfall Intensity 10 Year (mm/hr)	Rainfall Intensity 100 Year (mm/hr)	Peak Flow (L/s)	Total Peak Flow, Q (L/s)	Dia. (m) Actual	Dia. (mm)	Type	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)	Flow Time (min)	Ratio Q/Q full
	1310	1308			0.00	0.000	24.648	23.29	47.27				1,165	1,649	1.524	1500	Conc	0.17	23.4	3,039.6	1.67	0.23	54%
					0.00	0.000	7.586	23.29		63.77			484										
					0.00	0.000	0.000	23.29															
NW-93	1308	1306			0.00	0.000	24.648	23.53	46.97				1,158	1,701	1.524	1500	Conc	0.12	34.6	2,553.8	1.40	0.41	67%
			0.39	0.70	0.27	0.759	8.345	23.53		63.36			529										
					0.00	0.000	0.000	23.53															
NW-94					0.00	0.000	24.648	23.53	46.97				1,158										
			0.14	0.59	0.08	0.230	8.574	23.53		63.36			543										
					0.00	0.000	0.000	23.53															
	1306	1304			0.00	0.000	24.648	23.94	46.45				1,145	1,682	1.524	1500	Conc	0.11	44.6	2,445.1	1.34	0.55	69%
					0.00	0.000	8.574	23.94		62.65			537										
					0.00	0.000	0.000	23.94															
NW-95	1304	1302			0.00	0.000	24.648	24.49	45.77				1,128	1,745	1.524	1500	Conc	0.13	45.1	2,658.1	1.46	0.52	66%
			0.36	0.71	0.26	0.711	9.285	24.49		61.72			573										
					0.00	0.000	0.000	24.49															
NW-96					0.00	0.000	24.648	24.49	45.77				1,128										
			0.41	0.62	0.25	0.707	9.992	24.49		61.72			617										
					0.00	0.000	0.000	24.49															
NW-97	1302	1300			0.00	0.000	24.648	25.01	45.16				1,113	1,811	1.524	1500	Conc	0.12	84.7	2,553.8	1.40	1.01	71%
			0.21	0.62	0.13	0.362	10.354	25.01		60.88			630										
					0.00	0.000	0.000	25.01															
NW-98					0.00	0.000	24.648	25.01	45.16				1,113										
			0.57	0.70	0.40	1.109	11.463	25.01		60.88			698										
					0.00	0.000	0.000	25.01															
NW-99	1300	1214			0.00	0.000	24.648	26.02	44.01				1,085	1,887	1.524	1500	Conc	0.12	88.9	2,553.8	1.40	1.06	74%
			0.13	0.65	0.08	0.235	11.698	26.02		59.32			694										
					0.00	0.000	0.000	26.02															
NW-31					0.00	0.000	24.648	26.02	44.01				1,085										
			0.94	0.70	0.66	1.829	13.527	26.02		59.32			802										
					0.00	0.000	0.000	26.02															
								27.07															
					0.00	0.000	36.422	27.07	42.87				1,561	2,685	1.651	1650	Conc	0.13	74.3	3,290.6	1.54	0.81	82%
NW-100	1214	1216	0.07	0.72	0.05	0.140	19.439	27.07		57.77			1,123										
					0.00	0.000	0.000	27.07															
NW-113	1216	343			0.00	0.000	36.422	27.88	42.05				1,532	2,651	1.651	1650	Conc	0.13	31.7	3,290.6	1.54	0.34	81%
			0.18	0.63	0.11	0.315	19.754	27.88		56.65			1,119										
					0.00	0.000	0.000	27.88															
	343	1218			0.00	0.000	36.422	28.22	41.71				1,519	2,629	1.651	1650	Conc	0.15	19.7	3,534.7	1.65	0.20	74%
					0.00	0.000	19.754	28.22		56.19			1,110										
					0.00	0.000	0.000	28.22															
	1218	INLET 1			0.00	0.000	36.422	28.42	41.51				1,512	2,617	1.651	1650	Conc	0.19	16.1	3,978.1	1.86	0.14	66%
					0.00	0.000	19.754	28.42		55.93			1,105										
					0.00	0.000	0.000	28.42															
								28.57															

1053, 1075 and 1145 March Road
Copperwood Estate
Project No.: 116132

STORM SEWER DESIGN SHEET

Copperwood Estate c/w Scenario 2 Servicing Strategy for Future / Existing Lands

FLOW RATES BASED ON RATIONAL METHOD

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION			AREA (ha)			FLOW								TOTAL FLOW	SEWER DATA								
Catchment ID	From Manhole	To Manhole	Area (ha)	C	AC (ha)	Indiv 2.78 AC	Accum 2.78 AC	Time of Concentration	Rainfall Intensity 2 Year (mm/hr)	Rainfall Intensity 5 Year (mm/hr)	Rainfall Intensity 10 Year (mm/hr)	Rainfall Intensity 100 Year (mm/hr)	Peak Flow (L/s)	Total Peak Flow, Q (L/s)	Dia. (m) Actual	Dia. (mm)	Type	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)	Flow Time (min)	Ratio Q/Q full
	1310	1308			0.00	0.000	24.648	23.29	47.27				1,165	1,649	1.524	1500	Conc	0.17	23.4	3,039.6	1.67	0.23	54%
					0.00	0.000	7.586	23.29		63.77			484										
					0.00	0.000	0.000	23.29															
NW-93	1308	1306			0.00	0.000	24.648	23.53	46.97				1,158	1,701	1.524	1500	Conc	0.12	34.6	2,553.8	1.40	0.41	67%
			0.39	0.70	0.27	0.759	8.345	23.53		63.36			529										
					0.00	0.000	0.000	23.53															
NW-94					0.00	0.000	24.648	23.53	46.97				1,158										
			0.14	0.59	0.08	0.230	8.574	23.53		63.36			543										
					0.00	0.000	0.000	23.53															
	1306	1304			0.00	0.000	24.648	23.94	46.45				1,145	1,682	1.524	1500	Conc	0.11	44.6	2,445.1	1.34	0.55	69%
					0.00	0.000	8.574	23.94		62.65			537										
					0.00	0.000	0.000	23.94															
NW-95	1304	1302			0.00	0.000	24.648	24.49	45.77				1,128	1,745	1.524	1500	Conc	0.13	45.1	2,658.1	1.46	0.52	66%
			0.36	0.71	0.26	0.711	9.285	24.49		61.72			573										
					0.00	0.000	0.000	24.49															
NW-96					0.00	0.000	24.648	24.49	45.77				1,128										
			0.41	0.62	0.25	0.707	9.992	24.49		61.72			617										
					0.00	0.000	0.000	24.49															
NW-97	1302	1300			0.00	0.000	24.648	25.01	45.16				1,113	1,811	1.524	1500	Conc	0.12	84.7	2,553.8	1.40	1.01	71%
			0.21	0.62	0.13	0.362	10.354	25.01		60.88			630										
					0.00	0.000	0.000	25.01															
NW-98					0.00	0.000	24.648	25.01	45.16				1,113										
			0.57	0.70	0.40	1.109	11.463	25.01		60.88			698										
					0.00	0.000	0.000	25.01															
NW-99	1300	1214			0.00	0.000	24.648	26.02	44.01				1,085	1,887	1.524	1500	Conc	0.12	88.9	2,553.8	1.40	1.06	74%
			0.13	0.65	0.08	0.235	11.698	26.02		59.32			694										
					0.00	0.000	0.000	26.02															
NW-31					0.00	0.000	24.648	26.02	44.01				1,085										
			0.94	0.70	0.66	1.829	13.527	26.02		59.32			802										
					0.00	0.000	0.000	26.02															
								27.07															
NW-100	1214	1216			0.00	0.000	36.422	27.07	42.87				1,561	2,685	1.651	1650	Conc	0.13	74.3	3,290.6	1.54	0.81	82%
			0.07	0.72	0.05	0.140	19.439	27.07		57.77			1,123										
					0.00	0.000	0.000	27.07															
NW-113	1216	1218			0.00	0.000	36.422	27.88	42.05				1,532	2,651	1.651	1650	Conc	0.13	31.7	3,290.6	1.54	0.34	81%
			0.18	0.63	0.11	0.315	19.754	27.88		56.65			1,119										
					0.00	0.000	0.000	27.88															
	1218	937			0.00	0.000	36.422	28.22	41.71				1,519	2,629	1.651	1650	Conc	0.15	19.7	3,534.7	1.65	0.20	74%
					0.00	0.000	19.754	28.22		56.19			1,110										
					0.00	0.000	0.000	28.22															
	937	INLET 1			0.00	0.000	36.422	28.42	41.51				1,512	2,617	1.651	1650	Conc	0.19	16.1	3,978.1	1.86	0.14	66%
					0.00	0.000	19.754	28.42		55.93			1,105										
					0.00	0.000	0.000	28.42															
								28.57															